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UNITED STATES COAST GUARD



# WARTIME SAFETY MEASURES

FOR

## MERCHANT MARINE

REGULATIONS - - RECOMMENDATIONS



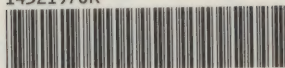
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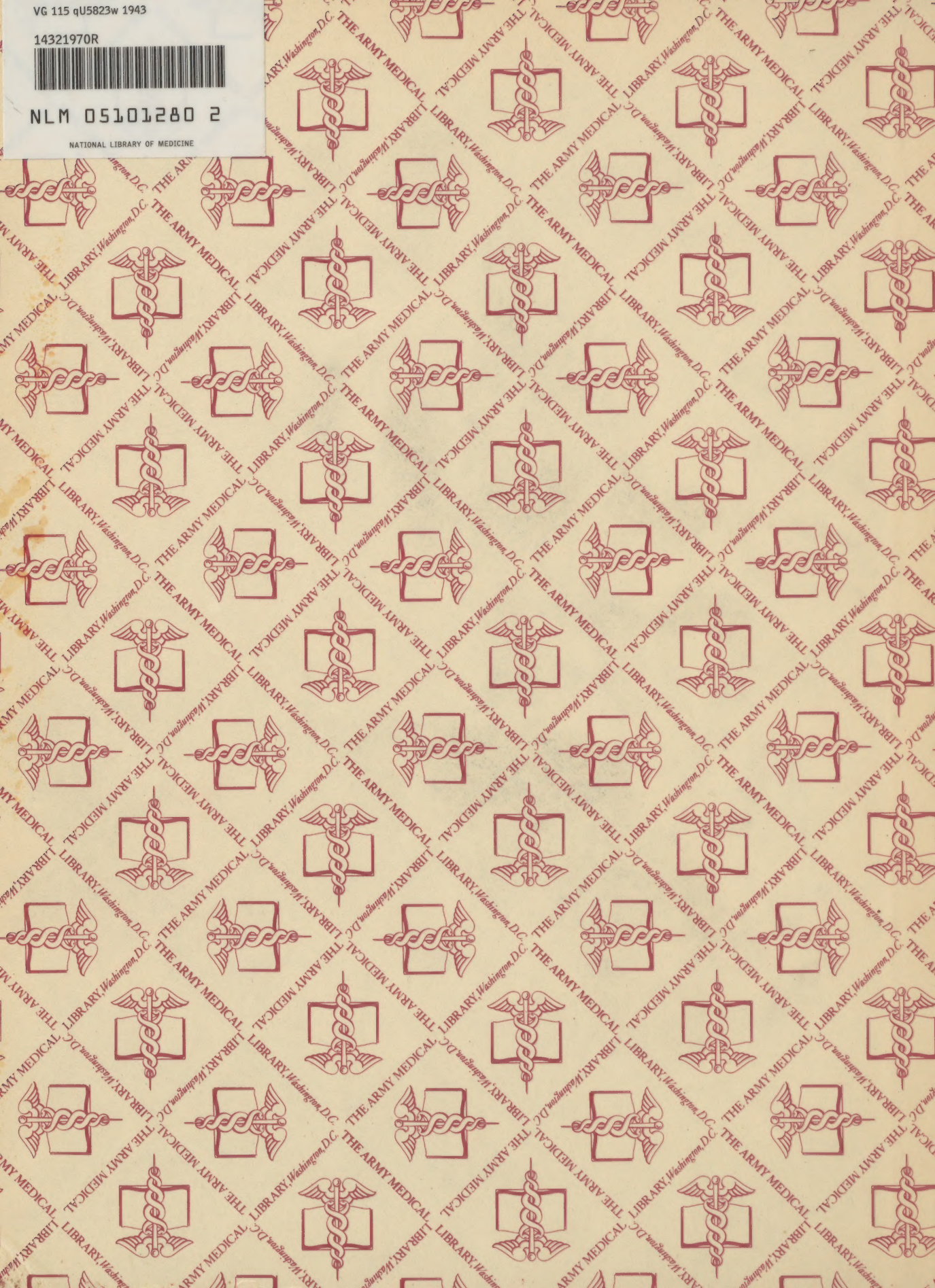


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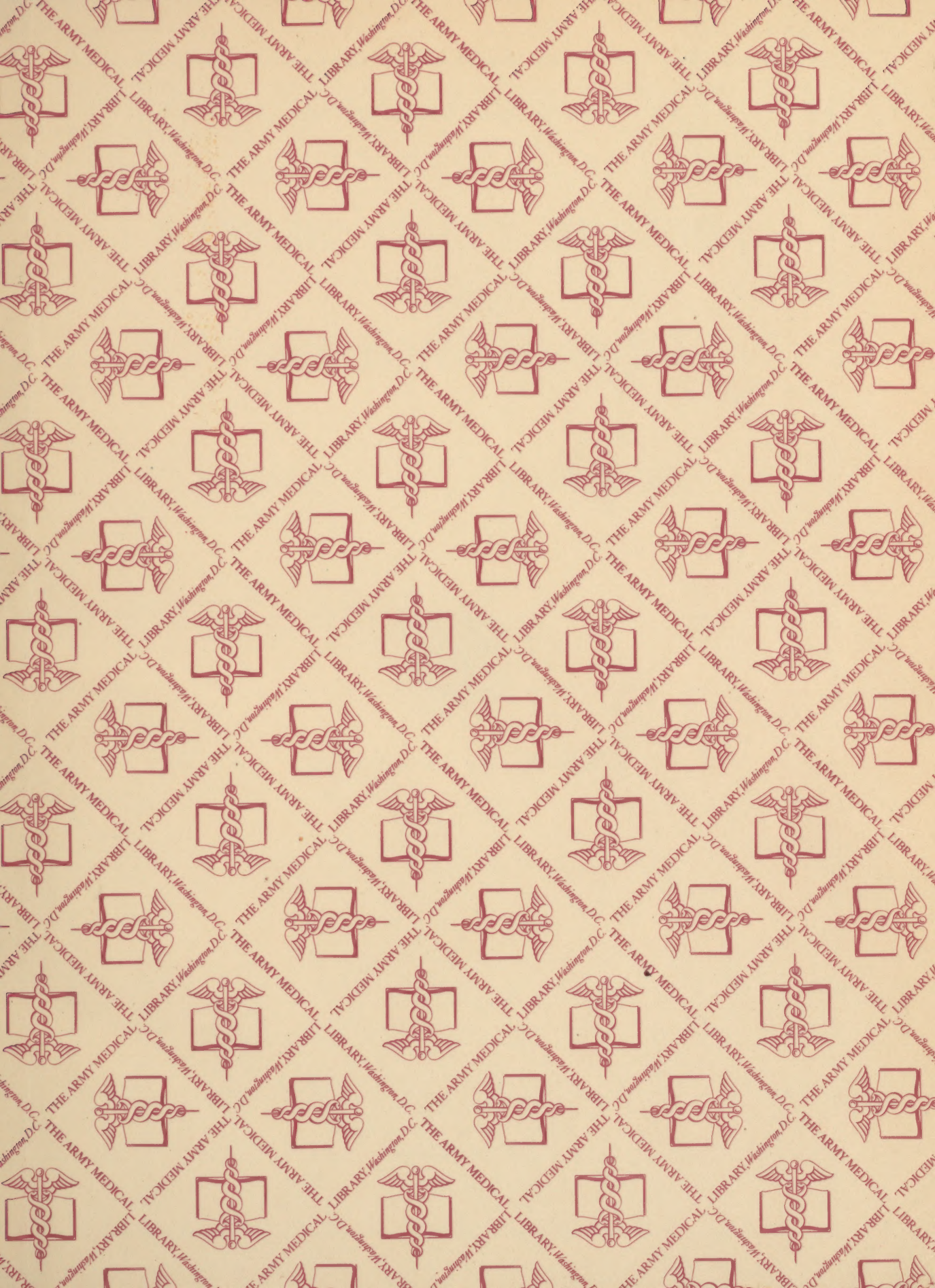


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UNITED STATES COAST GUARD

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# WARTIME SAFETY MEASURES

FOR

## MERCHANT MARINE

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REGULATIONS

. . .

RECOMMENDATIONS



EDUCATIONAL SERIES NO. 2

January 1943

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1943



UNITED STATES COAST GUARD

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## WARTIME SAFETY MEASURES

### FOREWORD

Normal peacetime requirements are inadequate in affording the necessary protection to seamen and shipping under wartime conditions. The United States Coast Guard has had, and will keep constantly under its consideration, the objective of developing additional precautionary and life-saving measures, including provisions for additional lifesaving and other equipment to meet the conditions arising from enemy attacks on ships and seamen.

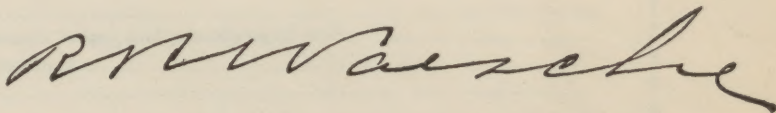
After consultation with various sections of the industry to the extent that the necessities of the situation and time permit, the regulations contained herein have been adopted and are to be effected, as soon as possible on all merchant ships with the primary objective of providing increased protection for seamen and shipping from enemy action. From the cooperation evidenced by all sections of the industry in complying with wartime measures, no difficulty should be encountered in obtaining this objective.

The measures contained herein are based on the practical experience of the seafaring fraternity engaged in the war and found effective in practice. This publication is printed in a form which is designed to insure the greatest possible understanding of these wartime measures; i. e., each regulation is printed in bold-face type and immediately followed by explanatory and interpretive material.

The educational material has been prepared from a digest of information obtained directly from foreign regulatory authorities and masters, officers and seamen of American, British, Norwegian, Dutch, Belgian, and other United Nations vessels, as well as notes taken at investigations of casualties occurring to American vessels during the present war.

By this medium of dissemination it is hoped that a better understanding and improved coordination of effort will obtain between the various governmental agencies concerned with Merchant Marine problems and thus enable the United States Coast Guard to secure administrative uniformity. The peacetime regulations are contained in chapter II, title 46, of the Code of Federal Regulations and the wartime regulations are contained in subchapter O of that title and chapter.

It is desirable and strongly recommended that all suggestions, orders, procedures, etc., calculated to effectuate the objective of safety, be made directly to the United States Coast Guard Headquarters, Washington, D. C.



R. R. WAESCHE,  
*Commandant, United States Coast Guard.*







# CONTENTS

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<b>WARTIME SAFETY MEASURES:</b>	<b>Page</b>
Applicability.....	1
Administration—exemptions.....	1
Cooperation of owners.....	1
Cooperation of inspectors.....	1
<b>DRILLS</b> .....	2
Lifeboat and fire drills.....	2
Frequent drills—seamen's recommendations.....	2
Object—method.....	2
Speed reduction for launching.....	2
Orders for launching.....	3
Equipment and motors.....	3
Rowing, sailing, sea anchor, storm oil, steering oar.....	3
Provisions—water.....	3
Rationing—procuring fresh water.....	3
Morale.....	4
Drinking water.....	4
First-aid kit.....	4
Boat covers.....	4
Distress signals—explanation of.....	4
Daytime smoke production.....	4
Signaling mirror.....	4
Cargo fires.....	4
Water fire-extinguishing system.....	4
Tank vessels—precautions against fire.....	4
Repair of lifeboats and life rafts.....	5
Simulated emergencies—speed in drills.....	5
<b>LIFEBOAT CONSTRUCTION</b> .....	6
Cubic capacity of lifeboats.....	6
Necessity for additional capacity.....	6
Air tanks of lifeboats.....	6
Adequacy of tanks.....	6
Removability for repair.....	6
<b>LIFEBOAT ACCOMMODATIONS—NUMBER—STOWAGE</b> .....	7
Cargo vessels and tank ships.....	7
Boat stowage limitations.....	7
Boat and raft accommodations.....	7
Miscellaneous craft.....	7
Towing vessels, manned barges, and miscellaneous craft.....	7
Arrangement for launching.....	7
<b>LIFEBOATS</b> .....	8
Readiness for lowering.....	8
Outboard position.....	8
Advantage of outboard position.....	8
Method of release.....	8
Chafing gear.....	8
Arrangement of outboard position.....	8
Rigidity of davits.....	10
Boat gripes.....	10
Gripes—rigging.....	10
Advantages of the line or rope.....	10



<b>LIFEBOATS—Continued.</b>	<b>Page</b>
Lifeboat fall reels—lowering bitts.....	10
Arrangement.....	10
Cruciform bitts.....	10
Footholds.....	10
Life lines from davit span.....	10
Dangers.....	11
Life lines not to be used as sea painter.....	13
Boat handling—instructions and practice.....	13
Size.....	13
<b>LIFEBOAT EQUIPMENT.....</b>	<b>14</b>
General.....	14
History.....	14
Additional equipment—stowage.....	14
Limitations of space.....	14
Seamen's judgment—recommendations.....	14
Defective equipment.....	14
Check list.....	14
Bailer.....	14
Bilge pump.....	14
New boats.....	14
Existing boats.....	15
Strainers.....	15
Antifire spray arrangements.....	15
Priming arrangements.....	15
Blankets.....	15
Necessity—specifications—stowage.....	15
Substitutes—warm clothing.....	15
Boathooks.....	16
Construction—stowage.....	16
Bucket.....	16
Construction.....	16
Canvas hood and side spray curtain.....	16
Fitting—lashing.....	16
Chart, pilot.....	16
Sources procurable.....	16
Instructions—ship's position.....	16
Branch Hydrographic Offices.....	20
Nautical publications free.....	20
Visits to Hydrographic Offices.....	20
Compass.....	20
Inefficient on metal boats.....	20
Daytime distress signals.....	21
Purpose.....	21
Distress lights.....	21
Instructions—use.....	21
Attract aircraft by smoke.....	21
Visibility.....	21
Ditty bag.....	21
Specified contents.....	21
Drinking cups.....	21
Use of ration cups.....	21
Saving provision containers.....	22
Drinking water—containers—construction.....	22
Existing lifeboats.....	22
New lifeboats.....	22
Construction of containers.....	22
New vessels.....	22
Precautions, tanks and containers—existing boats.....	22



**LIFEBOAT EQUIPMENT—Continued.**

<b>Drinking water—containers—construction—Continued.</b>	<b>Page</b>
Filling and sealing containers.....	23
Changing water—cleaning tanks.....	23
Water testing.....	23
Securing bung plugs.....	23
Additional water supply.....	23
Additional liquids.....	23
<b>First-aid kit.....</b>	<b>23</b>
Care of injured.....	24
Shock.....	24
Cleansing wounds—use of disinfectants.....	24
“Immersion foot” treatment.....	25
Massage oil.....	25
Condensed first aid.....	25
<b>Fishing kit.....</b>	<b>29</b>
Fishing instructions.....	32
Fish is food and drink.....	32
Twelve general rules when fishing.....	32
Fishing tackle and how to use it.....	32
Rig No. 1—Hook and line.....	37
Rig No. 2—Mackerel jig.....	32
Rig No. 3—Feather jig.....	33
Rig No. 4—Hook, line, and sinker.....	33
Rig No. 5—Grapple for snagging fish.....	33
Rig No. 6—Feather jig.....	33
Rig No. 7—Small harpoon or spear.....	33
Other articles in the kit.....	33
About fishing.....	34
Fishing with a light.....	34
Dried fish.....	34
Sharks.....	34
Turtles.....	34
Seaweed.....	34
Eels and snakes.....	35
Poisonous fish.....	35
Whales.....	35
<b>Flashlight.....</b>	<b>35</b>
Approved flashlights.....	35
<b>Grab rails.....</b>	<b>35</b>
Arrangements—precautions.....	35
Lives saved.....	38
Righting upturned boat.....	38
<b>Hatchets.....</b>	<b>38</b>
Type—dimensions.....	38
Lanyard.....	38
Brackets.....	38
Care.....	38
<b>Illuminating oil.....</b>	<b>38</b>
Kind of oil.....	38
Fouled oil in lantern.....	38
<b>Lantern.....</b>	<b>38</b>
Types.....	38
Lamp wicks.....	39
Stowage.....	39
<b>Life line.....</b>	<b>39</b>
Methods of securing.....	39
Care of life lines.....	39



<b>LIFEBOAT EQUIPMENT—Continued.</b>	<b>Page</b>
Life preservers.....	39
Use as life buoy.....	39
Locker.....	39
Construction.....	39
Arrangement.....	39
Equipment in locker.....	40
Manila line.....	40
Use—substitutes.....	40
Mast and sails.....	40
Inapplicability of peacetime exemptions.....	40
Rig, area and quality of sails.....	40
Mast stays.....	40
Matches.....	40
Type of container.....	40
Oars.....	40
Steering oar distinguished.....	43
Wood for oars.....	43
Weight of oars.....	43
Painters.....	43
Use of sea painters.....	43
Rig of painter under wartime conditions.....	43
Fetching abreast lifesaving net.....	44
Rigging—releasing.....	44
Securing toggle pin.....	44
Additional painter.....	44
Plugs.....	44
Plugs for wooden boats.....	46
Arrangement—inspection.....	46
Propellers (hand-operated).....	46
Lubrication—care.....	46
Periodical tests.....	46
Provisions.....	46
Packing.....	46
Malting milk tablets—packing.....	47
Type “C” biscuits.....	47
Type “C” biscuits—packing.....	47
Pemmican—packing.....	47
Rations—calculations.....	47
Eating rations.....	47
Care of bread boxes.....	47
Number and stowage of containers.....	48
Design of containers.....	48
Construction of containers.....	48
Gaskets.....	48
Rowlocks.....	48
Construction—fitting.....	48
Steering rowlocks.....	48
Rudder and tiller.....	48
Fitting—removal of yoke and line.....	48
Efficiency.....	49
Sea anchor.....	49
Sizes.....	49
Caution.....	49
Bucket as sea anchor.....	49
Oil container.....	49
Signal flag.....	50
Color, use.....	50
Ties for bending.....	50
Material.....	50

<b>LIFEBOAT EQUIPMENT—Continued.</b>	<b>Page</b>
Signaling mirrors.....	50
Desirability of light reflectors.....	50
Distance effective.....	50
Visibility of flash.....	50
Sighting instructions.....	50
Construction.....	52
Signal pistol.....	52
Parachute flares—daytime use.....	53
Inspection—care—replacements.....	53
Removal of unapproved pistols and cartridges.....	53
Storm oil.....	53
Container construction.....	53
Suitable oils.....	53
Bullet-hole plugs.....	53
Wooden plugs.....	53
Canvas bag—rags.....	53
Supplementary repair equipment.....	53
Substitutes.....	53
<b>MOTOR LIFEBOAT.....</b>	<b>54</b>
Vessels on which required.....	54
Equipment.....	54
Motor and accessories.....	54
Advantages of motor lifeboats.....	54
Construction.....	54
Fuel—motor testing.....	54
Mast and sail.....	54
<b>LIFE-RAFT ACCOMMODATIONS.....</b>	<b>55</b>
Passenger vessels.....	55
Cargo vessels and tank ships.....	55
Towing vessels, manned barges, and miscellaneous craft.....	55
Stowage.....	55
<b>LIFE RAFTS.....</b>	<b>56</b>
Stowage—quick release.....	56
Launching arrangements.....	56
Skids—friction reduction.....	56
Pelican hook.....	59
Release from two points.....	59
Painter—not to be secured.....	59
Reinforcing—water containers.....	59
Lashing equipment.....	59
<b>LIFE-RAFT EQUIPMENT.....</b>	<b>63</b>
General.....	63
Lashing arrangements.....	63
Releasing arrangements.....	63
Inspection.....	63
Supplementary equipment.....	63
Bridles.....	63
Distress lights.....	63
Display—daytime use.....	63
Caution in use.....	64
Drinking cups.....	64
Type.....	64
Drinking water.....	64
Water containers.....	64
Renewing drinking water.....	64
Water tanks—cleaning—spray prevention.....	64
First-aid kit.....	64
Fishing kit.....	65



<b>LIFE-RAFT EQUIPMENT—Continued.</b>	<b>Page</b>
Life line.....	67
Life-line arrangement.....	67
Manila line.....	67
Lashed at raft side.....	67
Matches.....	67
Containers—type.....	67
Oars.....	67
Suitable oars—lashing.....	67
Painter.....	67
Securing painter.....	67
Provisions.....	68
Packing of provisions.....	68
Provision containers.....	68
Number of containers—stowage.....	68
Rowlocks.....	68
Construction—fitting.....	68
Sea anchor.....	69
Construction.....	69
Self-igniting water light.....	69
Type—Electric water lights.....	69
Method of rigging.....	69
Signal flag.....	69
Size—use.....	69
Signaling mirrors.....	69
Desirability of light reflectors.....	69
Distance effective.....	69
Line of flash.....	70
Storm oil.....	70
Containers—distribution—suitable oils.....	70
Bullet-hole plugs.....	70
Rags—adhesive tape.....	70
<b>LIFE FLOATS.....</b>	<b>71</b>
Number—equipment—stowage.....	71
Color of water lights.....	71
Method of rigging and release.....	71
<b>LIFE PRESERVERS.....</b>	<b>72</b>
Number—stowage.....	72
Wearing of kapok type.....	72
Wearing of other types.....	72
Distribution.....	72
Stowage chests.....	72
<b>SPECIAL EQUIPMENT.....</b>	<b>73</b>
Portable emergency radio transmitters.....	73
Emergency radio installation.....	73
Stowage—use.....	73
Antenna rigging—height essential.....	73
After mast.....	73
Abandon-ship kit.....	73
Directions for giving morphine.....	79
Directions for using sulfadiazine tablets.....	79
Directions for using sulfanilamide powder.....	79
Directions for using oil cleaning solution.....	79
Directions for using tannic acid jelly.....	79
Directions for using chemical heating pads.....	79
Oil cleansing solution.....	79
Additional equipment.....	79
Buoyancy of kits.....	81
Sealing.....	81

<b>SPECIAL EQUIPMENT—Continued.</b>	<b>Page</b>
Lifeboat skids—fenders—skates .....	81
Skids on ship's side .....	81
Boat fenders—skates .....	81
Lifesaving nets .....	81
Rigging .....	81
Drills .....	82
Bottom weight .....	82
Sizes .....	82
Release—simultaneously with boat gripes .....	82
Embarkation ladders .....	82
Treads—distance pieces .....	82
Inspection .....	82
Lifesaving suits .....	82
Accessibility .....	82
Knowledge of suit—inner clothing—life jacket .....	82
Exercise for blood circulation .....	82
Watertightness at neck .....	83
Stowage .....	83
Care—repair kit .....	83
Use—exposure suit .....	83
Whistles and jackknives .....	83
Necessity—use—accessibility—jackknife .....	83
Necessity—use—accessibility—whistle .....	83
Life-preserver light .....	84
Color—condition—use .....	84
Drills—wearing lights .....	84
Spare lights—extra batteries .....	84
Removal of calcium water lights .....	84
Calcium type hazardous—removal .....	84
Luminous marking .....	84
Application—type .....	84
Locations .....	84
Testing .....	85
Emergency ship's lights .....	85
Necessity—operation .....	85
Emergency flashlights .....	85
Construction—accessibility .....	85
Caps for lens .....	85
Emergency escape ladders—engineering spaces .....	85
Arrangement .....	86
Main engine and pumps—remote control .....	86
Necessity .....	86
Arrangement—operation .....	86
Condenser vacuum undesirable .....	87
Overboard discharges .....	87
Alternative arrangements .....	87
Degaussing .....	87
<b>SPECIAL PROVISIONS .....</b>	<b>88</b>
Security inspection .....	88
Thoroughness of inspection .....	88
Black-out enforcement .....	88
Light—black-out .....	88
Noise—black-out .....	88
Black-out arrangements .....	89
Sea connections to sides of vessels below the freeboard deck .....	89
Insufficiency of cast-iron sea connections .....	89
Reinforcement of cast-iron fittings .....	89
Replacement of cast-iron fittings .....	89



## SPECIAL PROVISIONS—Continued.

Sea connections to side of vessels below the freeboard deck—Continued.	Page
Valve extensions.....	89
Sea connections—protection.....	89
Straps.....	90
Concrete—welding.....	90
Purpose of concrete.....	90
Thickness of concrete.....	90
Mixture of concrete.....	90
Removal of ship's identification marks.....	90
Removal of vessel's name and home port.....	90
CARGO.....	91
Loading, stowage and inspection.....	91
Importance of proper loading and stowage—enforcement.....	91
ALL SEAGOING BARGES (NON-SELF-PROPELLED VESSELS).....	92
Applicability of emergency regulations.....	92
Lifeboat equipment.....	92
Life-raft equipment.....	92
HINTS.....	99
Attitude in boats.....	99
Leadership.....	99
Basket stretchers.....	99
Projections in boats.....	99
Wire pennant—sea painter.....	99
Drinking water—coral reefs.....	99
Spigots.....	99
Man ropes.....	99
Illumination of boat deck.....	99
Extra hatchet.....	99
Reel covers.....	99
Luminous cards.....	99
Salt-water soap.....	100
Whistle signals.....	100
Sleeping on hatches.....	100
Marking oars.....	100
Sand.....	100
Flashlight.....	100
Lash lifeboat equipment.....	100
Steering oar.....	100
Fair ship side for launching.....	100
Watertight doors.....	100
Lash fire extinguishers.....	100
Radio antenna.....	100
Secure accommodation doors.....	100
Secure deck equipment.....	100
Fire-resistant canvas.....	101
Whistle.....	101
Warm clothing—all waters.....	101
Use of existing air tanks for drinking water.....	101
Boiler fuel oil.....	101
Releasing gear.....	101
Safety harness or belt.....	101
Exercise in boats.....	101
Boat sailing.....	102
Constipation—Use of laxatives.....	102
UNINHABITED AREAS.....	102
Water.....	102
Turtles.....	102
Plants.....	102

<b>UNINHABITED AREAS—Continued.</b>	<b>Page</b>
Food from fresh water.....	103
Food along shore.....	103
Shell fish.....	103
Animals and insects.....	103
Birds.....	103
People.....	103
<b>ACTION IN EMERGENCY.....</b>	<b>104</b>
Minimizing the effect of explosions—blast.....	104
Flash.....	104
Going overboard.....	104
In the water.....	104
Protection against sun and heat.....	104
<b>SWIMMING.....</b>	<b>104</b>
Keeping afloat.....	104
Life jacket—wreckage.....	105
Methods of floating.....	105
Dog paddle—breast stroke.....	105
Oil-covered surface.....	105
Underwater swimming.....	105
Keep calm and relaxed.....	106
Leaving ship—direction of swimming.....	106
<b>CARE OF SURVIVORS.....</b>	<b>107</b>
First-aid treatment for certain conditions common among shipwreck survivors.....	107
Care of survivors suffering from extreme thirst.....	108
Starvation.....	109
“Immersion foot”.....	111
Frostbite and prolonged exposure to cold.....	111
Sunburns.....	111
Eye inflammation.....	111
Mental disturbances.....	112
<b>APPROVED EQUIPMENT.....</b>	<b>113</b>
Emergency radio transmitters.....	113
Electric water lights.....	113
Emergency lights.....	113
Life-preserver lights.....	113
Flashlights.....	114
Flashlight batteries.....	114
Lifesaving suits.....	115
Life preservers suitable for use with lifesaving suits.....	115
Luminous cloth or tape for marking interior accommodations, etc.....	115
Oil cleansing solutions.....	115
Chemical heating pads.....	115
Signal pistols.....	116
Cartridge flares.....	116
Lifeboat fenders (skates).....	116
Daytime distress signals (smoke signals).....	116
Bilge pumps for lifeboats.....	116
<b>DISTRIBUTORS.....</b>	<b>117</b>
Abandon-ship kit.....	117
<b>U. S. COAST GUARD DISTRICT OFFICERS.....</b>	<b>118</b>

## FIGURES

<b>FIGURE 1.—Outboard lifeboat stowage.....</b>	<b>9</b>
<b>FIGURE 2.—Cruciform bitt, welded type.....</b>	<b>11</b>
<b>FIGURE 3.—Cruciform bitt, cast steel type.....</b>	<b>12</b>
<b>FIGURE 4.—Lifeboat spray hood and attachment.....</b>	<b>17</b>
<b>FIGURE 4A.—Alternative method for securing spray hood and side curtain to lifeboat.....</b>	<b>18</b>
<b>FIGURE 4B.—Side spray curtain.....</b>	<b>19</b>
<b>FIGURE 5.—Pressure points—tourniquet applications.....</b>	<b>27</b>



	Page
FIGURE 5A.—Emergency fishing kit.....	31
FIGURE 6.—Lifeboat grab rails and lines.....	36
FIGURE 6A.—Position of grab rails.....	37
FIGURE 7.—Rig of sail and jib.....	41
FIGURE 7A.—Approximate dimensions and material standards for sails and masts.....	42
FIGURE 8.—Attachment of sea painter in lifeboat.....	45
FIGURE 9.—Sighting a signaling mirror.....	51
FIGURE 10.—Arrangement for life raft stowage.....	57
FIGURE 10A.—Details of arrangement for life raft stowage.....	58
FIGURE 11.—Pelican hook.....	60
FIGURE 12.—Pelican hook.....	61
FIGURE 13.—Life raft release arrangement.....	62
FIGURE 14.—Arrangement for lifeboat antenna mast (wooden).....	74
FIGURE 14A.—Detail arrangement for lifeboat antenna mast (wooden).....	75
FIGURE 14B.—Arrangement for lifeboat antenna mast (bamboo).....	76
FIGURE 14C.—Detail of halyard eye for bamboo antenna mast.....	77
FIGURE 14D.—Details of clamp for bamboo antenna mast.....	78
FIGURE 15.—Vertical skids and lifeboat fenders.....	80
FIGURE 16.—Efficient method of stowing equipment in Class 1A oar propelled lifeboat....	98
FIGURE 16A.—Stowage arrangement for bucket and daylight signals.....	93
FIGURE 16B.—Stowage of signal pistol outfit, flashlight, and distress signals.....	94
FIGURE 16C.—Stowage of illuminating and storm oils, lantern, matches, and extra wicks..	95
FIGURE 16D.—Stowage arrangement for lifeboat provisions.....	96
FIGURE 16E.—Stowage arrangement for massage oil and blankets.....	97
FIGURE 16F.—Stowage of miscellaneous items.....	98

## WARTIME SAFETY MEASURES

### APPLICABILITY

**Applicability.**—The regulations contained herein appear in subchapter “O,” chapter II, title 46, of the Code of Federal Regulations and are supplemental or additional to the general rules and regulations applicable to all ocean and coastwise vessels unless otherwise specified.

The comments and recommendations following each regulation are based on the analysis of the testimony of survivors and information received directly from masters, officers, and seamen. Make use of this material. It may save your life.

### ADMINISTRATION—EXEMPTIONS

**Administration—Exemptions.**—If compliance with any of the requirements set forth herein is shown to be unreasonable or impracticable, exemption may be granted upon satisfactory presentation of the facts and circumstances. Application for any such exemption should be made to the nearest district office. Headquarters shall be informed when exemptions have been granted, together with reasons therefor. In all cases, however, where the materials or equipments necessitated by these requirements are not available, it shall not be necessary to apply for formal exemption as above. While it is not intended that vessels be delayed for noncompliance, it is expected that diligent efforts will be made to meet these requirements as rapidly as is possible. (46 C. F. R. 152.4, 153.28.)

**Cooperation of owners.**—The cooperation of owners in seeing to it that vessels returning from foreign voyages are supplied with items of equipment at the first United States port of call is most necessary. The practice of vessels proceeding to the last United States port of discharge where the home offices of their agents or owners are located, before receiving supplementary equipment, should be discontinued. A check on character and availability of all emergency equipment should be made prior to vessel's departure from dock to eliminate possible confusion and delay if boarded at anchorage.

**Cooperation of inspectors.**—In all major ports the services of Merchant Marine Inspectors for the examination of emergency equipment, instructions in drills, and the use of lifesaving and fire-fighting appliances may be secured at any dock or while the vessel is at anchor in the open roadstead. Masters and owners and their agents should not hesitate to call upon this organization for service in this connection. It is recommended that advantage be taken, if deemed necessary, of the services available for boarding and inspection by Merchant Marine Inspectors prior to the vessels being made ready for departure to the point of convoy rendezvous or harbor anchorage.



## DRILLS

### LIFEBOAT AND FIRE DRILLS

***Lifeboat and fire drills.***—On all vessels the master or person in charge is responsible for instructing all on board in the use and purpose of the emergency equipment provided and for the conduct of frequent drills illustrating its use. The master and officers are to drill their crews until all on board are thoroughly familiar with the use and purpose of all safety equipment; are able to row and are familiar with the procedure for lowering boats, launching rafts and are proficient in quickly donning their lifesaving suits, if carried. In this connection, a fire drill and lifeboat drill with a boat in the water and boat crews exercised in rowing is to be held in every port of loading or discharge. When the master is satisfied that each member of the crew thoroughly understands his duties, he may then require that lifeboat drills, including lowering of all boats and the exercise of each member of the crew in lowering the boats and rowing, be held at longer intervals, but in no case longer than 30 days, except where a vessel may be at sea for a longer period.

On vessels engaged in voyages of more than 3 days' duration a lifeboat muster and fire drill are to be held at sea not less than once in every 4 consecutive days, and the master and officers are to instruct all of the crew, with the exception of those who cannot be relieved of their immediate duties, in the use of the various equipments which are on the vessel and fitted in the lifeboats. On all ships which carry persons in addition to the crew as passengers, such persons, are, where practicable, to be required by the master to participate in the lifeboat drills and receive instruction in the functioning and use of the various types of equipment. (46 C. F. R. 153.18.)

***Frequent drills—Seamen's recommendations.***—The most prevalent of all recommendations made by merchant seamen who have been the victims of submarine attack has been the necessity of frequent lifeboat drills.

***Object—Method.***—The successful handling of lifesaving equipment depends to the greatest degree on the speed and deliberation with which such equipment can be utilized, combined with seamanship of highest character. The problem of getting lifeboats successfully away from a ship which is sinking rapidly can be successfully solved only if all persons in the vessel's crew have been thoroughly drilled and instructed in getting the boats and rafts into the water. They must have confidence in the seamanship of the master and officers who conduct the drills. Such confidence can be obtained only by patient and firm handling at each drill period. Experience indicates that the men are only too willing to cooperate if they are only told patiently and in some detail what is expected of them. The drills and assignments should be given with full consideration of the fact that when the actual emergency arises, many men may show up on the scene in a semidazed or stunned condition.

The whole crew, and in particular the able seamen, are to be so instructed that in time of emergency they will be capable of taking over duties assigned by station bills to other persons. In short, the ideally drilled crew would be one which could be interchanged at will with no diminution in the efficiency with which the drill is conducted.

***Speed reduction for launching.***—The men should be impressed that with good seamanship and coolness it is entirely possible to take off everyone, but that lacking this the loss of many lives may ensue. The experiences of World War I in connection with launching lifeboats while the

ship still has considerable way on her, have already been repeated in World War II. Reviews of the circumstances surrounding the large loss of life in several cases where ships have been torpedoed indicate that the boats were practically "thrown away" while being lowered while the ship was moving ahead at as much as 8 to 10 knots speed. While it is possible, under peacetime conditions and with a well-drilled crew, to place a boat on the water while the ship is under way, skillful timing on the part of all concerned is necessary. However, any attempt to repeat such performances under wartime conditions is most unwise. All on board must be impressed that such action is most likely to result in capsizing the boat and dumping all occupants into the sea directly alongside the ship where they will soon be drawn into the propeller suction, slammed against the moving propeller, rudder or sternpost, and killed or seriously injured. A remote control arrangement carried to an accessible point on an upper deck in order to provide means of stopping the main engines is included in these regulations.

Experience has most clearly shown the necessity for providing and using this control as it has been found that many men have lost their lives through too great haste in getting the boats over the side before the ship has slowed sufficiently.

**Orders for launching.**—In order that the most efficient use may be made of the defensive equipment provided on board merchant vessels, a clear understanding should be had by the master, officers, and crew that no lifeboats are to be lowered into the water until a definite order to that effect is given.

**Equipment and motors.**—On vessels carrying motorboats, more than one man should be trained in running the motor. In fact, if possible, all who show aptitude should be so instructed and in such instruction should be included difficulties which may be encountered in keeping the motor running in a seaway. The use of each individual piece of lifeboat equipment should be explained to the entire crew.

**Rowing, sailing, sea anchor, storm oil, steering oar.**—The entire crew should be instructed in the rudiments of small-boat seamanship and it should be impressed upon them that their ability to survive in a lifeboat will depend to the greatest degree on the skill with which they are able to handle the boat. They should be given instructions in operating mechanically propelled boats, rowing, setting sail, and handling the boat under sail. The use of the steering oar in keeping the boat's head to the sea should be stressed. The use of the sea anchor, together with its accessory storm oil container, should be demonstrated.

**Provisions—Water.**—A list stating the quantities of water and provisions and instructions for rationing should be provided in each lifeboat. At boat drills the officer or person in charge of each lifeboat should check the provisions and water provided against the requirements. In particular, water containers should be carefully examined, as cases have already come to notice where occupants of boats found the containers only half full after abandoning the ship.

**Rationing—Procuring fresh water.**—Men should be cautioned about the necessity for the person in charge of the boat starting an immediate system of food rationing on the first day in the boat. As soon as the boat is safely away, precaution should be taken by the person in charge to guard against pilferage of provisions and water. It should be remembered that drinking water is of the utmost importance in sustaining life. The ration of water should be drunk slowly. In latitudes where rainfall is plentiful occupants of boats should have no difficulty in replenishing their water supply. A sail or other available canvas such as a boat cover or oil skin coat should be used as a funnel to catch rain water. An air tank can be removed and the end opened up and utilized to receive rain water thus secured. It should be remembered that the canvas may be saturated with salt until sufficient rain has washed it away. It may be necessary to dispose of the first few quarts secured in order to prevent the salt residue from contaminating the whole catch. Men should be told the danger of drinking sea water. It is indisputable that persons who drink sea water invariably die.



**Morale.**—The subject of rations and rationing should be discussed with the men and the importance of eating a small amount several times a day stressed. The discussion should also touch upon the necessity for maintaining morale in a lifeboat. The person in charge should immediately get the boat's company settled down and in order to prevent moping he should set watches and assign each person a regular job.

**Drinking water.**—Every man should be told the necessity for the conservation of drinking water by occupants of lifeboats. While all seamen understand that the supply of water is limited, the men should be advised that the amount of water provided has been increased over 300 percent and that there are now in both new and existing boats a minimum of 10 quarts per person. Experience has shown that even in the tropics, men can survive on less than three 10-ounce water rations daily. The person in charge of the boat should issue water in small amounts frequently during the day as when monotony becomes intolerable, any diversion such as eating and drinking small amounts of water is welcome and helps to keep up the men's spirits.

**First-aid kit.**—It should not be forgotten that a first-aid kit is included in the boat's equipment. The men should be told of this fact and if possible rudimentary instructions in first aid given, the contents of the kit described, as well as the purpose and usage of the various units.

**Boat covers.**—On tank vessels it has, in general, been found desirable to keep the boats covered to prevent the boat and her equipment from being showered with oil thrown up by the explosion of a torpedo or mine. On dry cargo vessels boat covers should, unless snow and ice conditions indicate to the contrary, be kept off and stowed in the boat or adjacent to it in order that they may be taken along in the boat to be used for supplementary protection and cover.

**Distress signals—Explanation of.**—All of the various types of distress signals, signal pistols, distress lights, daytime smoke signals, mirrors, etc., should be explained to the men and demonstrated where necessary to clear up any misunderstanding.

**Daytime smoke production.**—The use of daytime smoke signals during the present war was, in one case alone, responsible for saving the lives of nearly 600 survivors of a large passenger vessel. In this connection, it should be remembered that it may, if smoke signals are unavailable, be desirable to burn distress flares if friendly aircraft appear during the day, as the smoke emitted may be sufficient to attract attention. A parachute flare fired from a signal pistol in the daytime was responsible for the sighting and subsequent rescue of survivors in a lifeboat by a friendly vessel even though her officers were looking into the sun at the time. A fire in a bucket smothered with partially dried seaweed would make a sufficiently dense smoke to be visible from the air or the water.

**Signaling mirror.**—The use of signaling mirrors provided should be explained to the men. Flashes from signaling mirrors or tin cans have already been very effective in bringing aid to survivors on boats and rafts. The continuous rapid flashing of a mirror can be seen by plane pilot or observers at high altitudes when they are unable to discern a boat or raft on the water. Sighting instructions for use with signaling mirror should be understood by all seamen. (See fig. 9.)

**Cargo fires.**—When about to embark on or engage in a voyage where the vessel is carrying deck cargo, the crew should be instructed at the fire drill of the means to be adopted in event of fire in such cargo.

**Water fire-extinguishing system.**—Deck cargo should be stowed so that fire hydrants on deck are not obstructed to such a degree that it is impossible to couple the hose. Hoses on deck should, if possible, be attached to fire hydrants at all times, including when the vessel is at sea, in order that they may be readily available to fight fire in the event of aircraft attack with incendiary or other bombs which may cause fire. In connection with fire drills, there should be a prearranged signal to the engine room to be sounded when enemy aircraft are sighted in order that the fire pump may be started immediately.

**Tank vessels—Precautions against fire.**—On tank vessels, the men should be instructed that the actual necessities of abandon-ship procedure may be modified by the probability in some

cases that the vessel may be saved. In this connection, when conditions after enemy attack indicate, every effort is to be made to prevent fire and to put out existing fire by washing overboard with the fire hose the oil left on deck by the explosion of the torpedo or mine. Arrangements should, on such vessels, be made to start the fire pumps immediately after the attack if the engine room is tenable.

***Repair of lifeboats and life rafts.***—Repair kits provided in lifeboats should be called to the men's attention and the procedure for their utilization mentioned. Repairs to lifeboat hulls, life rafts and their air tanks and equipment should be explained and should, of course, be made as soon as possible after any shell fire or aircraft attack, if circumstances permit. Particular attention should be directed toward maintaining intact the drinking water containers of lifeboats and life rafts as well as the provision containers.

***Simulated emergencies—Speed in drills.***—Masters and officers, in conducting abandon-ship and fire drills, should pay particular attention to every detail of the procedure for abandoning ship and combating fire under various simulated conditions. Various emergency situations should be anticipated in order to clarify in the minds of officers and men the action they would take if and when the time arises. When drills are being conducted, attention should be given to instructions of responsible petty officers in the use of the remote-control arrangements provided for the main engines and overboard pump discharges. Too much stress cannot be laid upon the necessity for speed in all actions taken at drills in order to cut seconds off the total time to get the boats in the water, bearing in mind the danger of launching lifeboats with too much headway on vessel. Continual efforts in this direction give the men confidence and greatly improve their morale.



## LIFEBOAT CONSTRUCTION

### CUBIC CAPACITY

***Cubic capacity of lifeboats.***—On all mechanically propelled cargo and tank vessels which are certificated for the first time after 1 January, 1943, the cubic carrying capacity of the lifeboats provided shall be calculated on the basis of 15 cubic feet per person. This rated carrying capacity shall be plainly marked on at least two of the thwarts. On such lifeboats the marking of the name plate with rated carrying capacity in persons, shall be omitted. (46 C. F. R. 153.3.)

***Necessity for additional capacity.***—The above regulation providing additional lifeboat capacity insures an added margin of safety to take care of the crowded conditions in boats that may result from the circumstances surrounding abandonment after enemy action. The boats provided on existing cargo and tank vessels will, if all personnel get away safely and are equally distributed, be loaded to only half their rated capacity, thereby precluding any of the discomforts of overcrowding.

### AIR TANKS

***Air tanks of lifeboats.***—The air tank capacity in lifeboats on all mechanically propelled cargo and tank vessels which are certificated for the first time after 1 January, 1943, shall equal at least one-tenth of the total volume of the lifeboat in cubic feet and in addition sufficient air tank capacity shall be provided to float the boat (including its equipment) when filled with water. (46 C. F. R. 153.3.)

***Adequacy of tanks.***—The air tank capacity provided by the above regulation is more than adequate, even with several tanks damaged, to provide sufficient reserve buoyancy to keep the boat afloat and support persons clinging to the gunwale.

***Removability for repair.***—It is recommended that separately fitted air tanks of lifeboats be checked to determine that they are easily removable in order that they may, if the occasion arises, be taken out in order to repair, if possible, the holes in the hull plating made by shell fragments, machine gun bullets, or other missiles.

## LIFEBOAT ACCOMMODATIONS—NUMBER—STOWAGE

### CARGO VESSELS AND TANK SHIPS

***Cargo vessels and tank ships.***—Cargo vessels and tank ships shall carry a sufficient number of lifeboats on each side to accommodate all persons on board: *Provided, That* on tank ships of 3,000 gross tons and over, having superstructure amidships, and propelling machinery aft, the lifeboat capacity required by the general rules and regulations shall be provided by at least four lifeboats, one on each side in way of the after accommodations and one on each side in way of amidships accommodations: *Provided, further, That* where the number of persons permitted by the certificate of inspection is augmented by the addition of naval personnel for the purpose of protection or observation, additional lifeboat capacity for such personnel will not be required. (46 C. F. R. 153.2.)

***Boat stowage limitations.***—The peacetime regulations require that all cargo vessels and tank ships carry sufficient lifeboats on each side to accommodate all persons on board. However, the above proviso is necessary because of lack of proper stowage space which makes it impracticable to add davits and boats.

***Boat and raft accommodations.***—The war emergency regulations provide a sufficient number of approved rafts in addition to the number of boats required above, which rafts are available to naval personnel. It is recommended, however, that where the arrangement and the size of the vessel make it feasible, that larger lifeboats be provided under davits to provide lifeboat accommodations for all persons on board. In all cases where davits are available, they should be utilized to handle additional boats to provide boatage for all.

### MISCELLANEOUS CRAFT

***Towing vessels, manned barges, and miscellaneous craft.***—Towing vessels, manned barges, and miscellaneous craft shall carry sufficient lifeboats to accommodate all persons on board. (46 C. F. R. 153.2.)

***Arrangement for launching.***—Masters and officers of such vessels should give particular attention to the manner in which the lifeboats are carried in order that they may be lowered safely into the water from their stowed position.



## LIFEBOATS

### READINESS FOR LOWERING

**Readiness for lowering.**—Masters shall, with due regard to safety, cause all lifeboats attached to davits other than gravity davits to be properly griped in the outboard position as will allow immediate lowering in case of emergency. On all vessels guys are to be rigged from the davit heads when the boats are carried in the outboard position. (46 C. F. R. 153.3.)

**Outboard position.**—It is desired to point out that the regulation is so worded as to allow a high degree of discretion on the part of the master. During the present war, the desirability of carrying boats swung out is a subject which has become quite controversial in nature. The idea has been advanced that while carrying the boats swung out saves time in getting them into the water, it does at the same time render them more liable to damage by the blast of a torpedo-explosion near by. Review of war casualties seem to indicate that in general nearly all boats and rafts on the side which the torpedo strikes are rendered useless. There have been cases where boats stowed aft and swung inboard on the side struck were not damaged by the explosion.

**Advantage of outboard position.**—The advantage in saving time by having the boats swung out is certainly obvious, because even though the boat or boats on the side which is struck by a torpedo or mine are damaged, those on the opposite side are out and available immediately. In all cases serious consideration should be given to reducing the number of lines which have to be released in order to free the boat for lowering. In this, as in other matters, the essence of good abandon-ship practice requires simplicity.

**Method of release.**—Some officers have found that speed in releasing the boats and lowering away was gained by utilizing a single gun tackle, the standing part of which could be cut with a sharp hatchet, rather than attempting to release pelican hooks on lines under severe strain (perhaps in the dark) on a heavily listed vessel. With one stroke of the hatchet the gripes may be released and the boat swung free. Experience of many officers who have been torpedoed three or four times bears out again and again the necessity for foolproof arrangements which will work with a ship standing almost on end or with a list of 30° or 40°.

**Chafing gear.**—The special gripes and chafing gear should be provided in order that the boats may be secured in the outboard position without damage.

**Arrangement of outboard position.**—Certain advantages are obtained by carrying the boats in the outboard position at as high a point above the load water line as is possible. An arrangement similar to that shown in figure 1 is recommended because this arrangement allows boats to be swung inboard with ease, if necessary. On some existing vessels where the relative position of the davit heads and the boats are such as to preclude the boat's keel clearing the margin plate, when the vessel has a slight list, even with the falls' "two blocked", the absolute necessity of carrying the boats swung out is most obvious. On such vessels, if there is insufficient freeboard to carry the boats swung out, they will, of course, have to be carried inboard, but in all such cases serious consideration should be given to raising the davit bases sufficiently to provide the necessary clearance in order that the boats may be swung out easily and clear the edge of the boat deck when the vessel is quite heavily listed, say to 25°.

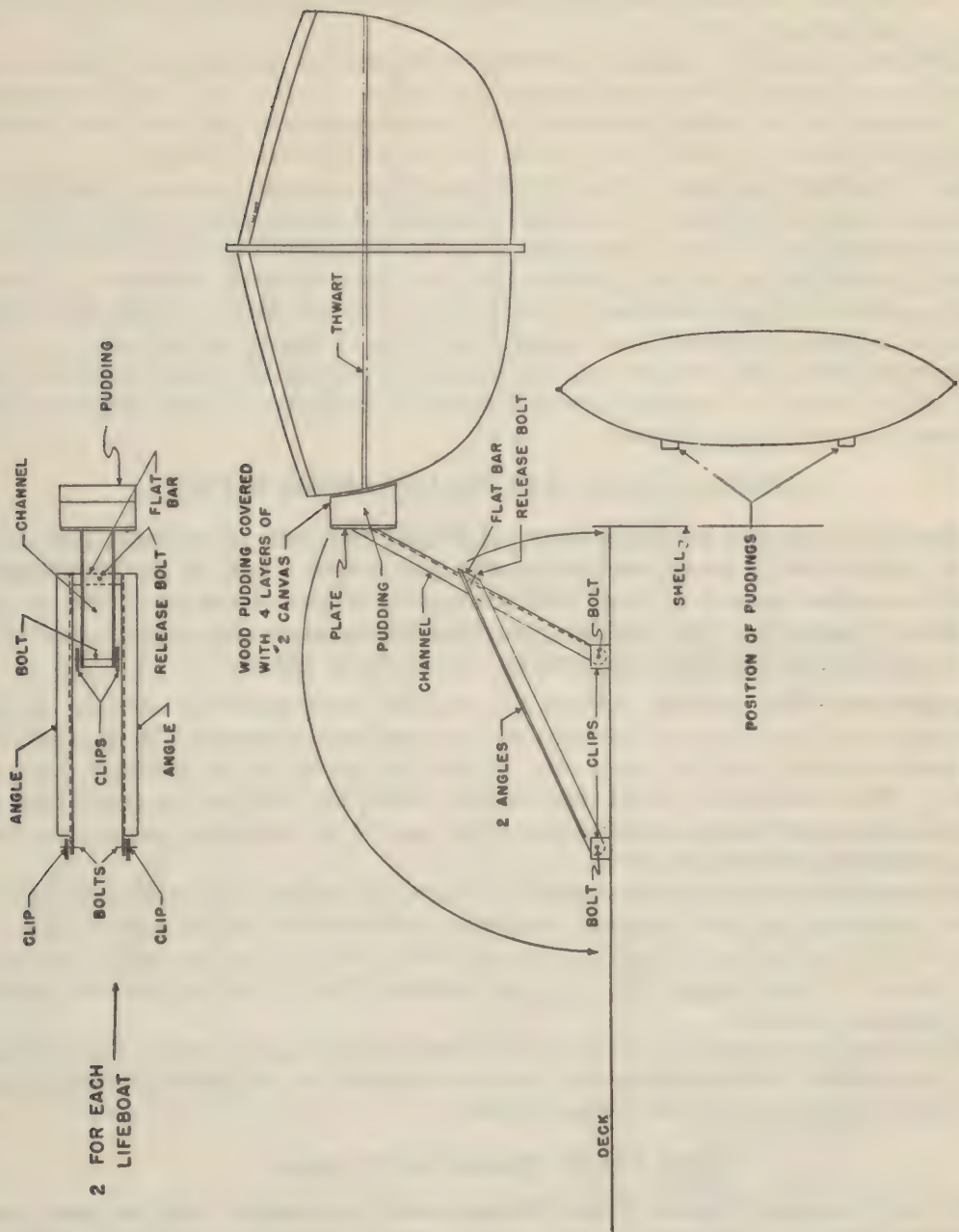


Figure 1.—Outboard lifeboat stowage.



**Rigidity of davits.**—Very few types of davits are considered sufficiently rigid under the conditions found in wartime to not require additional guys fore and aft to take care of sudden longitudinal strains and the continual racking caused by the weight of the boat, carried swung out, with the vessel in a seaway. Where necessary, an additional shackle should be placed on the top of the davit head or wire strop utilized to fasten guys which should be rigged with a small tackle or other means to set them up taut.

**Boat gripes.**—Experience at drills and testimony of survivors both strongly indicate the need for extreme care and attention to detail in rigging boat gripes. In this, as in other matters of seamanship pertaining to lines holding equipment such as boats and rafts fast to the ship, the desirability of using manila or sisal which can be easily cut, cannot be overemphasized.

**Gripes—rigging.**—Boat gripes should, in all cases, be rigged in such a manner that they can be released from a single attachment. If necessary, brackets or fittings should be provided in order that the gripes might lead fair and be arranged with a high degree of simplicity. Pelican hooks, if used, should be attached to the ship, a simple ring only flying out with the gripes. In any case where permanently fitted grab rails show a tendency to catch the gripes at drills, they should be removed and the alternative manila line arrangement shown in figure 6 substituted.

**Advantages of the line or rope.**—As mentioned above, manila or sisal which can be cut, has many advantages since if anything gets foul during an emergency a quick stroke of a hatchet or knife is enough to free it immediately.

### LIFEBOAT FALL REELS—LOWERING BITTS

**Lifeboat fall reels and lowering bitts.**—Lifeboat fall reels of suitable type and capacity are to be fitted in such location as will give a direct lead to the lowering bitts. On all self-propelled vessels of over 1,000 gross tons where cleats are fitted in lieu of lowering bitts, cruciform bitts shall be provided where necessary and located in such position as will render lowering practicable. (46 C. F. R. 153.15.)

**Arrangement.**—The distance between fall reels and bitts should be sufficient to allow a man to properly surge the falls over the bitts without backing into the reel. Reels should be constructed in such a manner that they do not turn too easily, to prevent undue spinning and consequent overrunning. Where davits are located close to deck houses, the best location of the reels will be found to be on the top of the houses in order that they may be out of the way and at the same time accessible and clear of all obstacles.

**Cruciform bitts.**—In order that manila falls may be surged safely and easily, the cruciform bitts fitted under the above regulation are to be of suitable size and properly designed. The sizes indicated in Figures 2 and 3 indicate the minimum diameters and the general design which should be utilized. Where manila falls which are materially over 3½ inches are fitted, larger bitts should, of course, be provided.

**Footholds.**—Consideration should be given to providing cleats or providing other suitable foothold or support in way of bitts in order that a man lowering may be enabled to hold his balance and properly surge the falls when the vessel is heavily listed.

### LIFE LINES FROM DAVIT SPAN

**Life lines from davit span.**—Each lifeboat shall be provided with at least four life lines fitted to a span between the davit heads. Such life lines shall be knotted at approximately three-foot intervals and of sufficient length to reach the water at the vessel's lightest seagoing draft. (46 C. F. R. 153.16.)

**Dangers.**—Life lines are provided and rigged, in order to allow men standing in a boat which is rapidly being lowered, a means of steadying themselves and affording a line to hang on to if the

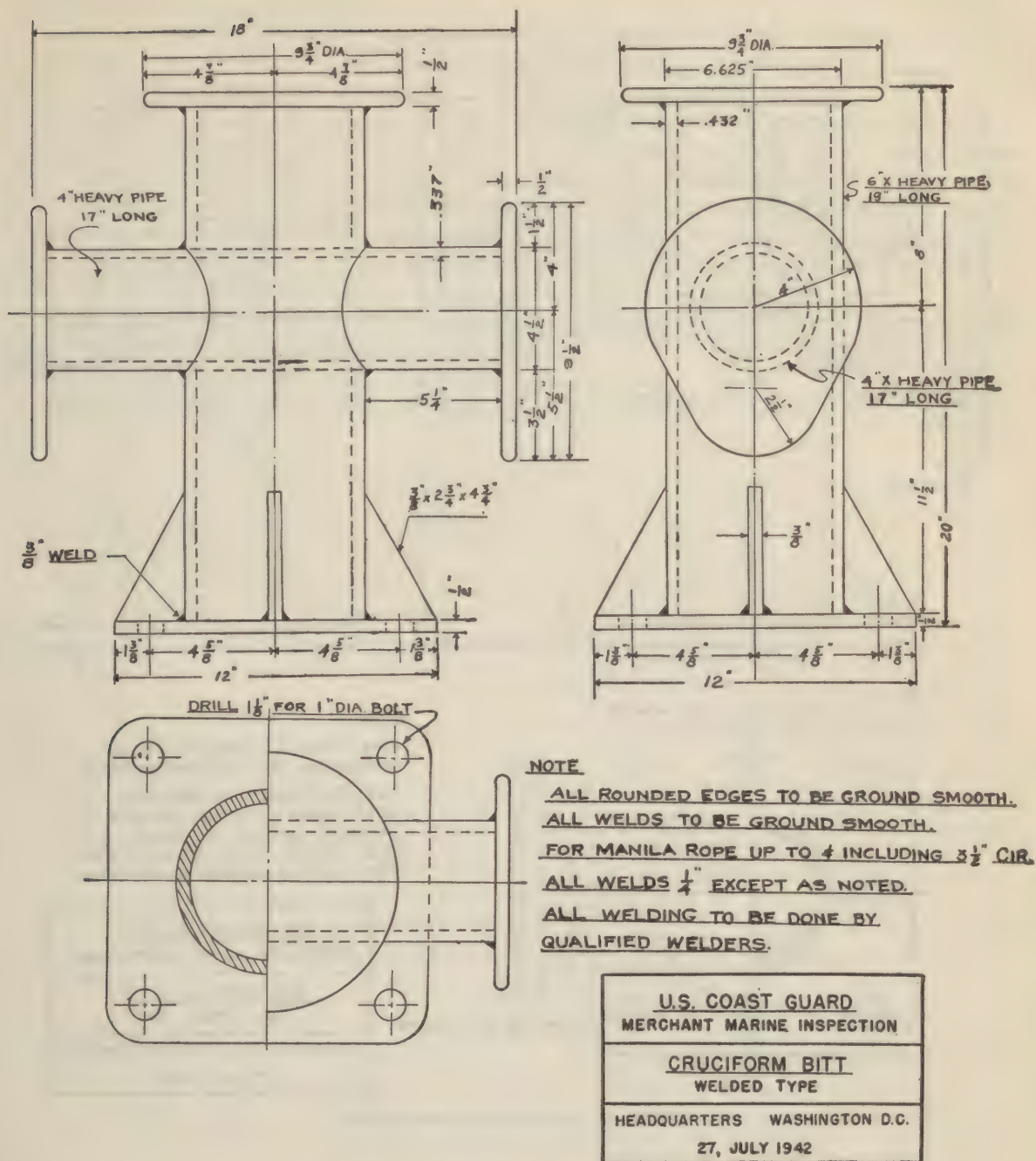


FIGURE 2.—Cruciform bitt, welded type.





boat capsizes. Life lines can, however, under certain conditions become dangerous, and if many persons are in the boat it is deemed more desirable to toss the lines over the inboard gunwale to preclude any possibility of persons becoming entangled in the life line as it rapidly pays out, should the boat be dropped suddenly.

***Life lines not to be used as sea painter.***—In a recent sinking the improper use of a life line was the cause of the drowning of six men. A misguided seaman in his zeal to hold a lifeboat alongside the ship, grabbed a life line and took a turn around the after thwart. The bow of the boat sheered off as the strain came on this line and the next sea capsized the boat throwing the occupants into the water. In this case, apparently no attempt was made to use the sea painter which should have been fast well forward at the ship's rail. All members of the crew should be cautioned in connection with performing any act which will allow the bow of the lifeboat to swing off and turn her on her beam ends in the sea. The sea painter provided by regulation should be rigged—with due consideration to the vessel's draft—so as to relieve the falls of towing strain, and unless the vessel is actually making sternway, the after fall should be released first.

***Boat handling—Instructions and practice.***—Efficiency in handling lifeboats alongside a ship can be acquired only by instruction and practice. New men must be trained until they get the feel of a small boat rolling around under their feet.

***Size.***—Life lines should be made up of not less than 2-inch manila or 2½-inch sisal.



## LIFEBOAT EQUIPMENT

### GENERAL

**History.**—The equipment to be included in the lifeboats of merchant vessels has been given careful study by the leading maritime nations. Similarity of the peacetime lifeboat equipment for all nationalities of vessels is indicative of the uniformity of experience. The items of equipment thus required were adapted to normal conditions when every consideration would be given by all vessels and shore establishments to the immediate rescue and succor of the survivors.

**Additional equipment—Stowage.**—Wartime conditions as presently existing in World War II have required additional equipment especially adapted to aid men in boats to survive the rigors of the sea. A means of attracting the attention of possible rescue vessels or airplanes is needed and has been provided. These new equipments and accessories take up much valuable space in lifeboats. It is, therefore, most necessary that lifeboat equipment be carefully and judiciously stowed in such manner (See fig. 16) that it may interfere as little as possible with the boat's complement and further that it may be reasonably protected from damage while at the same time being readily available for use.

**Limitations of space.**—Hardly a day passes at Headquarters during which additional suggestions or recommendations for some new item or accessory for use in lifeboats are not received. All of these suggestions receive the most careful consideration. However, it is obviously impossible to include, because of considerations of weight and space, each and every item which might be of some use in saving life and adding to the comfort of the boat's occupants.

**Seamen's judgment—Recommendations.**—The best judgment of the practicability and value of the items of lifeboat equipment herein required will be formed by seamen themselves and written in the record of lifeboat logs and the testimony of survivors. Headquarters most earnestly requests that men on the ships forward suggestions as to new equipment or modifications in design and arrangement of presently required items. The tools and accessories of the sea have developed in the most conservative manner over the centuries. Intensive use in such times as these brings progressive development in design and focuses attention upon defects.

**Defective equipment.**—To serve its purpose best, lifeboat equipment should be of a quality and character adapted and suited to the use for which it is intended. The assistance of ship's officers and men in calling the attention of the Coast Guard to defective or unsuitable equipment will be appreciated in order that steps may be taken to rectify the defects or replace the equipment.

**Check list.**—The complete equipment for lifeboats follows, which may be found convenient for checking.

### BAILER

**Bailer.**—One bailer of sufficient size and suitable for bailing with lanyard attached. (46 C. F. R. 59.11.)

Any type of metal or wooden scoop or can may be utilized for a bailer. A small bucket will be found useful for this purpose. It should, of course, be of suitable capacity; probably not less than 1 gallon.

### BILGE PUMP

**Bilge pump—New boats.**—Lifeboats constructed on or after 1 January, 1943, shall be equipped with an approved semirotary wing type or equally suitable and efficient bilge

pump permanently affixed in a suitable position in the boat. The pump shall be of a type not easily deranged, the materials used in its construction shall be of a character not readily deteriorated by the action of salt water, and it shall be so constructed as to be readily disassembled for repairs. A suitable foot valve shall be located on the suction side of the pump and the suction opening shall have a cross-sectional area of not less than 0.7854 square inch. The pump shall be located well down in the center line of the boat and be fitted with a flexible discharge hose at least 6 feet in length and having a cross-sectional area or opening not less than that of the suction opening.

**Existing boats.**—Lifeboats built prior to 1 January, 1943, shall be provided with a pump of the type specified above, or a good quality barrel bilge pump may be provided. The material of which the pump is manufactured shall be of a corrosion-resisting character. The barrel shall be at least 2 inches in diameter and fitted with a discharge hose at least 6 feet in length and not less than 1½ inches in diameter.

**Strainers.**—All pump suctions shall be fitted with suitable strainers and provision shall be made for allowing the strainer to be cleaned. (46 C. F. R. 153.6.)

**Antifire spray arrangement.**—On tank vessels semirotary type pumps in lifeboats should be provided with a direct sea suction which can be placed in service by turning a simple valve. The discharge hose of such pumps should have fitted a suitable nozzle to enable a stream of water to be sprayed or squirted over the boat and the occupants while operating the pump. This arrangement will enable survivors to keep the boat wetted down if it is necessary to pass through burning oil on the water. Barrel type pumps may be utilized in the same way by placing them in a bucket of sea water or by flooding the boat to a depth of 4 to 6 inches.

**Priming arrangements.**—Semirotary and similar pumps in lifeboats require initial priming when dry. This can be accomplished by removing the cap or plug from the tee fitting on the discharge side of the pump and pouring a small amount of water (approximately one quart) into the chamber to produce an efficient seal. The cap or plug should be replaced before putting pump in operation.

## BLANKETS

**Blankets.**—At least six woolen blankets in waterproof covers. (46 C. F. R. 153.6.)

**Necessity—Specifications—Stowage.**—Blankets provided by the above regulation have been found necessary, first, for the use of the sick and injured and, secondly, for the use of members of the crew employed down below who otherwise would not be able to secure protective clothing. Requests from owners, operators, and blanket manufacturers as to the quality of blanket desired have been received at Headquarters. In reply to such requests, such persons have been informed that satisfactory blankets should contain not less than 80 percent wool of which 20 percent is virgin wool and be at least 66 inches by 80 inches or a reasonable equivalent. They should also have a minimum weight of at least 2.8 pounds with a thread count of 52 for warp (minimum) and 40 for filling (total). The most preferable arrangement and stowage of blankets is in packages of two, each package wrapped in heavy waterproof cellophane or other similar material which can be sealed watertight and protected against injury by a heavier outside wrapper. Placing blankets in waterproof canvas duffle bags has been found to be insufficient protection. Stowage is bulky and results in damage and deterioration to the blankets by mildew.

**Substitutes—Warm clothing.**—It is not the intention of the regulation in providing six blankets to make available additional protection from exposure for each member of the boat's complement. Lifesaving suits, which are primarily designed to protect men from exposure and keep their clothing dry—a most essential factor in survival—are provided. Warm clothing is worn by seamen when navigating the colder latitudes. In this connection, the master should call the men's attention to the need of warm clothing in the lifeboats and point out that they should have readily available an article or two of warm, light outer clothing before abandoning ship in any latitude.



### BOATHOOKS

**Boathooks.**—Two boathooks of clear-grained white ash of suitable length but not less than 8 feet long by 1½ inches in diameter. (46 C. F. R. 59.11.)

**Construction—Stowage.**—The boathooks should be stowed in the boat in such a position as to be most readily available. The hook fitting should be of galvanized, best quality, malleable cast iron which is elastic enough to bend without fracturing. The fit of the pole into the socket of the hook should be tight and properly made with a suitable pin to hold it in place.

### BUCKET

**Bucket.**—One galvanized iron bucket of about 2-gallon capacity with lanyard attached. (46 C. F. R. 59.11.)

**Construction.**—Buckets should be of good quality and preferably hot-dipped galvanized after the ears and bail have been fitted. They should have a heavy wired rim and bottom in order that they may withstand the hard usage to which they may be put in a lifeboat. In large lifeboats an additional bucket will be found useful.

### CANVAS HOOD AND SIDE SPRAY CURTAIN

**Canvas hood and side spray curtain.**—A canvas hood and side spray curtain to provide shelter to the occupants of the boat. The hood and curtain shall be made of No. 8 yellow waterproofed cotton duck. The canvas hood should extend from the stem to the mast, but not less than approximately one-third of the length of the lifeboat, and must be easy to rig.

The side spray curtain shall extend from the after side of the canvas hood to approximately the after thwart and shall extend about 12 inches above the gunwale. The side spray curtain may be held in place by means of rods installed in the rowlock sockets so as to be easily transferred from side to side according to the direction of the wind. (46 C. F. R. 153.6.)

**Fitting—Lashing.**—The lacing of hoods and side spray curtains along the gunwale of the boat should be such as to prevent spray from being funneled inside the boat. In other words, the fastening provided should be weathertight and seamanlike. The height of the spray hood where it fastens to the mast should be sufficient to allow occupants of the forward part of the boat reasonable head room. Spreaders together with stanchions fitted outboard may be necessary in order that this condition may be obtained. Details of a suitable arrangement are shown in figure 4. Alternative arrangements for gunwale fastening in the form of a lashing eye in way of the end of the spray hood may be utilized in lieu of clips or eyes under the nosing piece. A sketch of this alternative arrangement is shown in figures 4A and 4B.

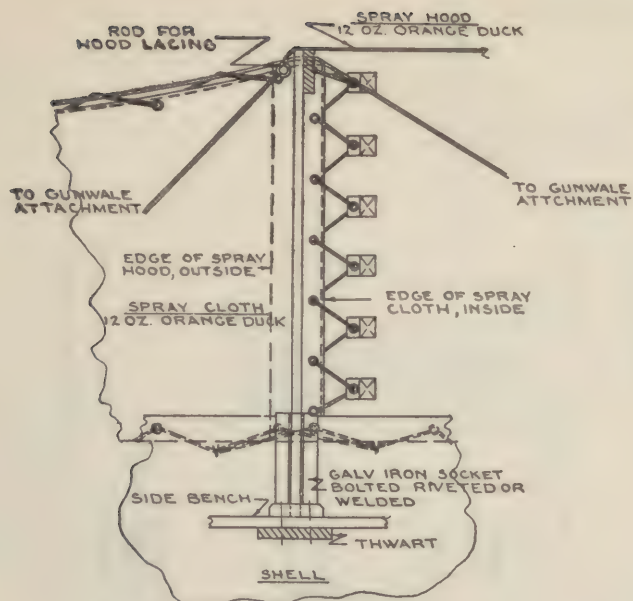
### CHART—PILOT

**Chart—Pilot.**—A current hydrographic office (U. S. Navy) pilot chart of the waters navigated, in a metal container (similar to a sounding tube case). (46 C. F. R. 153.6.)

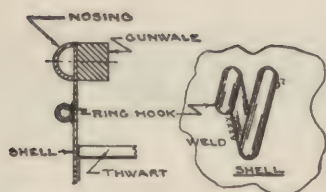
**Sources Procurable.**—The latest issue of pilot charts may be secured from the Hydrographic Office (Navy Department) Washington, D. C., or from any of its branches which are located in the principal seaports of the United States.

**Instructions—Ship's position.**—In order that the pilot chart may best serve its purpose of providing survivors adrift in a lifeboat with prevailing current and wind information, all responsible persons throughout the voyage and all persons on board at the time of the casualty, should be informed of the approximate position of the vessel. In instructing members of the crew in the various items of

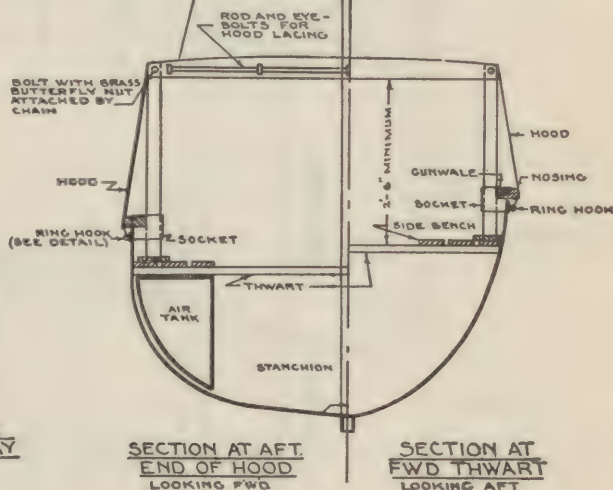
### SPRAY HOOD CONSTRUCTION AND ATTACHMENT



#### METHOD OF SECURING HOOD TO SPRAY CLOTH & LOOKING OUTBOARD



#### SHELL ATTACHMENT FOR SECURING HOOD AND SPRAY CLOTH LASHINGS



#### GUNWALE ATTACHMENT FOR SECURING HOOD AND SPRAY CLOTH LASHINGS ON BOATS WITHOUT NOSINGS

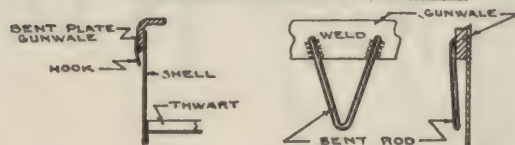
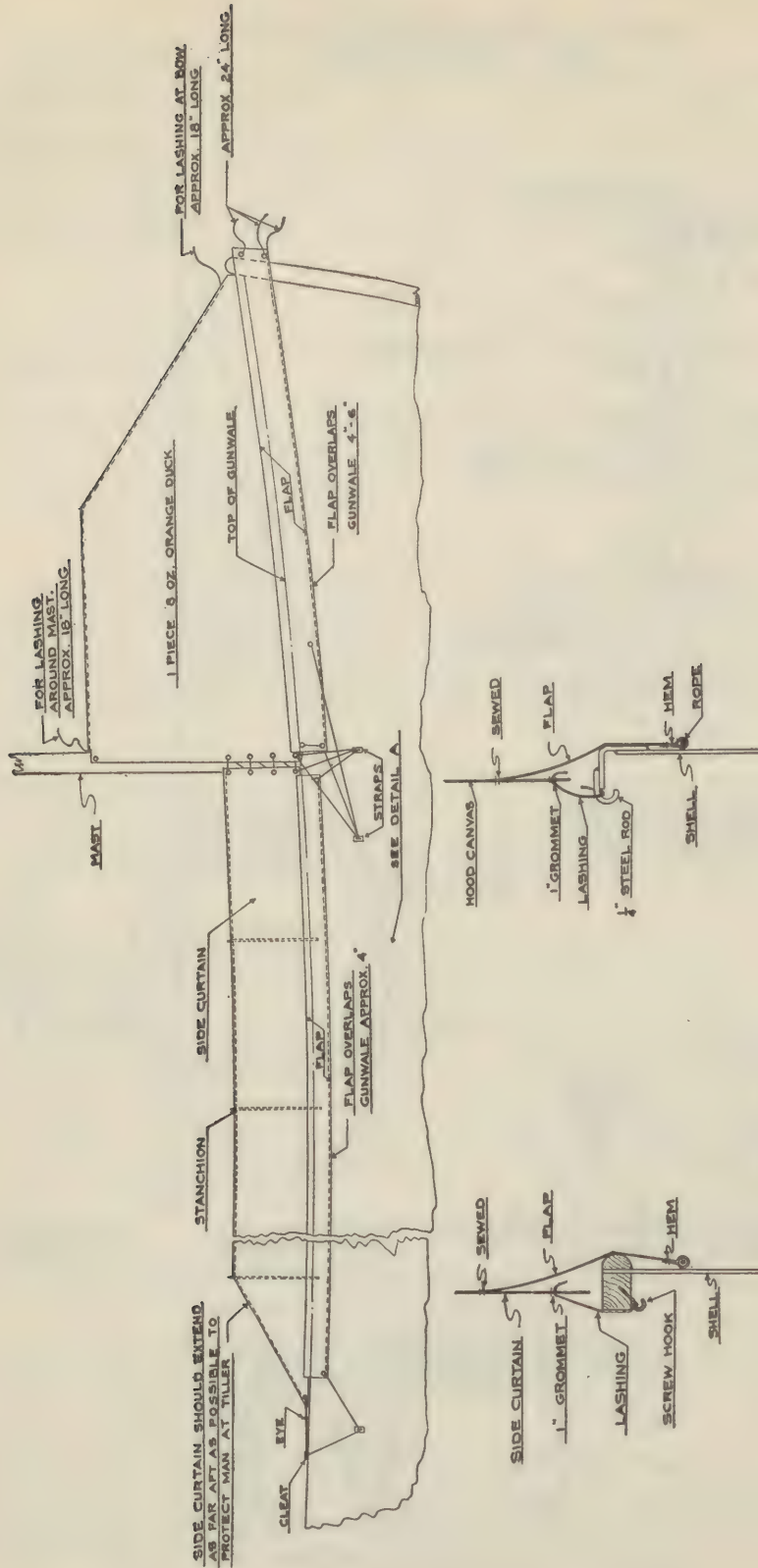


FIGURE 4.—Lifeboat spray hood and attachment.





SPRAY HOOD  
SECTION LOOKING FWD.  
STEEL GUNWALE

SPRAY HOOD  
SECTION LOOKING FWD.  
WOOD GUNWALE

Figure 4A.—Alternative method for securing spray hood and side curtain to lifeboat.

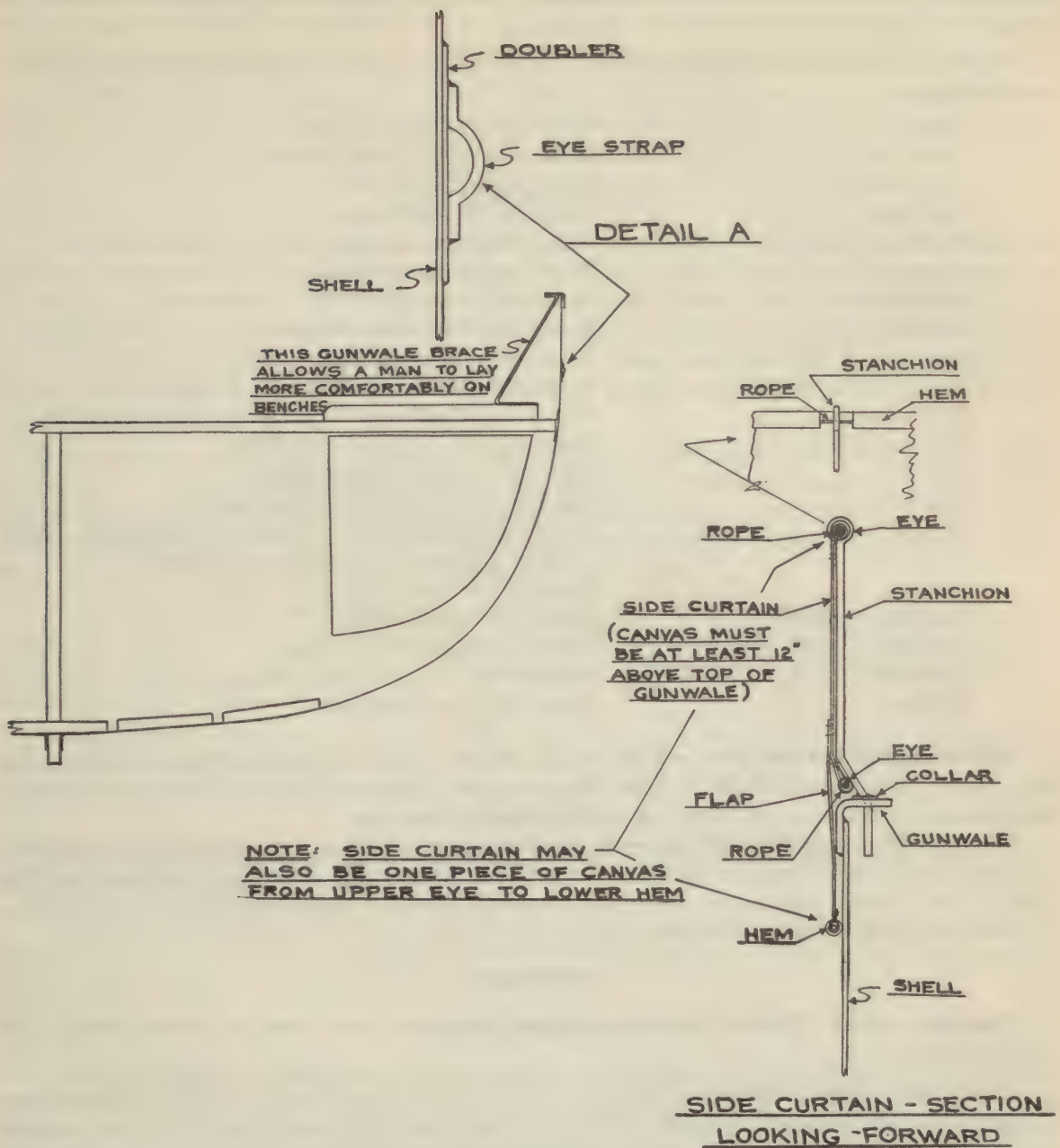


FIGURE 4B.—Side spray curtain.



lifeboat equipment, an explanation of the method of using the pilot chart should be included. Men should be shown how they can determine the best course to steer to take advantage of natural ocean currents and prevailing winds in order to most quickly reach land or a position where assistance may be expected. A pencil or two should be included in the stowage container provided for the chart. A protractor will also be useful.

**Branch Hydrographic Offices.**—Pilot charts can be secured at the following branch Hydrographic Offices:

Boston.....	Tenth Floor, Customhouse.
New York.....	Room 506, No. 17 State Street.
Philadelphia.....	Room 1001, Customhouse.
Baltimore.....	Room 15, Customhouse.
Norfolk.....	Room 213, Customhouse.
Savannah.....	First Floor, Customhouse.
New Orleans.....	Room 215, Customhouse.
Galveston.....	Room 402, Post Office Bldg.
San Juan, P. R.....	Room 604, Federal Bldg.
San Pedro, Calif.....	Room 206, Federal Bldg.
San Francisco.....	Merchant's Exchange.
Portland, Oreg.....	Room 211, U. S. Courthouse Bldg.
Seattle.....	Room 453, Federal Office Bldg.
Honolulu.....	Old Naval Station, Ala Moana Road.
Detroit.....	Room 843, Federal Bldg. (Also Headquarters, Lakes Division, Branch Hydrographic Office)
Duluth.....	Room 321, Federal Bldg.
Sault Ste. Marie <sup>1</sup> .....	Room 10, Federal Bldg.
Chicago.....	Room 326, U. S. Courthouse.
Cleveland.....	Rooms 1426, 1428, Standard Bldg.
Buffalo.....	Room 345, Post Office Bldg.

**Nautical publications free.**—The branch offices do not sell publications, but issue the Pilot Charts, Hydrographic Bulletin, Daily Memorandum, Notice to Mariners, Notice to Aviators, Memorandum to Aviators, and Reprints to Cooperating Observers.

**Visits to Hydrographic Offices.**—Branch Hydrographic Offices are supplied with the latest information and publications pertaining to navigation. Masters and officers of vessels are cordially invited to visit them, and consult freely the officers in charge. Office hours 9 a. m. to 4:30 p. m., except Saturdays when the offices close at 1 p. m.

## COMPASS

**Compass.**—One efficient liquid compass with not less than a 2-inch card. (46 C. F. R. 59.11.)

**Inefficient on metal boats.**—The use of a small boat compass in a metal lifeboat having a metal bar keel presents some difficulties which cannot be fully overcome. Under such circumstances the compass gives, at best, only an approximation of direction. When in use the compass should be kept up as high as possible and on the center line away from the keel and hull of the boat.

<sup>1</sup> Also operates continuously during the open season of navigation at the Canal Office, St. Mary's Falls Canal, where the chief quartermaster on watch may be consulted at the hydrographic desk.

## DAYTIME DISTRESS SIGNALS

**Daytime distress signals.**—Four self-contained smoke signals of an approved type. Such signals shall be positively and easily operated and under adverse weather conditions, shall produce, while floating on the surface of the water, smoke in sufficient intensity, volume, and color as to be easily visible from aircraft. (46 C. F. R. 153.6.)

**Purpose.**—Approved smoke signals are designed to give a large volume of orange- or reddish-colored smoke which has proved very effective in calling attention of pilots and observers to drifting lifeboats. The smoke signals should, of course, be thrown overboard to leeward.

## DISTRESS LIGHTS

**Distress lights.**—A watertight metal case containing 12 self-igniting red lights capable of burning and giving forth a brilliant red flame of not less than 500 candlepower for at least 2 minutes. Each distress light shall be treated and made impervious to moisture, and the manufacturer shall place upon it a statement in clear black letters covering the candlepower and burning range, the directions for firing, the trade name of the distress light, and the name and address of the manufacturer. (For specification of container see 46 C. F. R. 59.11, 153.24.)

**Instructions—Use.**—The instructions printed on each distress light should be carefully read and thoroughly understood before ignition, and when ignited the light should be held in a position to the lee side so as to prevent burning particles from falling on persons in the lifeboat. The remaining lights should be kept in the container with the lid tightly closed. No lights should be removed from the container except for inspection or actual use.

**Attract aircraft by smoke.**—Flares can be attached to a boathook by lashing in order to hold them higher in the air and away from the boat's company. If friendly aircraft are sighted during the daytime, it may be advisable to light a flare as the smoke, being quite visible from the air, may attract the pilot's attention.

**Visibility.**—It should not be forgotten that the higher the distress light can be held above the water the greater is the distance at which it will be visible.

## DITTY BAG

**Ditty bag.**—One canvas bag containing sailmaker's palm, needles, sail twine, marline, and marlinspike. (46 C. F. R. 59.11.)

**Specified contents.**—At least one ball of sail twine, three sail needles (approximately No. 13), and about three-fourths pound of marline should be provided, together with the sail palm and a marlinspike of about 8 inches in length.

## DRINKING CUPS

**Drinking cups.**—A total of three drinking cups, at least two of which shall be of the well-bucket type, consisting of a tubular bucket about one inch in diameter and three inches long, marked in one-half ounce graduations. A chain or lanyard shall be attached to bucket-type cups in order that they may be dropped into the drinking water tanks. Drinking cups shall be fabricated of rust-resisting material. (46 C. F. R. 153.6.)

**Use of ration cups.**—Narrow-mouth, bucket-type ration cups will go into the bung hole of a wooden water breaker, if carried, as well as into the narrow mouth of the opening in water tanks, as provided in new lifeboats. Segregation of the ration cups by the person in charge of the boat will do much to prevent pilferage of water from the tanks or breakers during the nighttime as any attempt to secure water by other means would be certain to attract attention.



***Saving provision containers.***—Survivors should save empty pemmican tins or other metal containers as they may be found useful for rationing food and drinking water and in providing each individual with a receptacle for eating and drinking.

### DRINKING WATER—CONTAINERS—CONSTRUCTION

***Existing lifeboats.***—Lifeboats constructed prior to October 15, 1942, shall carry a total of at least 10 quarts of water for each person the boat will, on the basis of 10 cubic feet per person, accommodate. An equal number of air tanks, from each side of the boat, may be removed and replaced with water containers, or the air tanks may be converted to water containers by reinforcing them where necessary and securely attaching a watertight fitting at the top of each tank through which the water may be extracted. No valves, cocks, etc., for drawing off the water shall be fitted. The drinking water previously required in existing boats may also be carried in these side water containers if capacity and other considerations make it desirable.

***New lifeboats.***—Lifeboats constructed after October 15, 1942, shall be provided with at least 10 quarts of fresh water for each person the boat will, on the basis of 10 cubic feet per person, accommodate. Drinking water shall be distributed and stowed as follows:

Four separate tanks preferably having approximately the same capacities equally distributed in inboard and outboard locations, as for example: One side tank port and one side tank starboard under the side benches plus two inboard tanks symmetrically located under the side benches, thwarts, or in the ends of the boat.

***Construction of containers.***—Drinking water tanks shall be substantially constructed of galvanized steel or equivalent corrosive-resistant material. When a tank has a capacity in excess of 25 gallons, a swash plate shall be fitted. A threaded nipple, approximately 2 inches inside diameter, is to be substantially attached to the top of the tank. The nipple is to project upward a sufficient distance to receive a corrosive resistant screw cap knurled or otherwise provided with means so that it can be easily removed by hand. A reinforced opening not less than 5 inches in diameter fitted with a watertight cover shall be provided in the upper portion of each tank to permit internal examination and treatment. No spigot or cocks are to be fitted. A threaded metal drain plug and flange shall be provided in the bottom of each tank in such position that it is easily accessible for removal by wrench when the tank is in its stowed position in the boat. Water tanks shall be substantially supported away from the inside of the boat and shall be readily removable for examination.

***New vessels.***—All lifeboats on all mechanically propelled cargo and tank vessels which are certificated for the first time after January 1, 1943, shall be provided with drinking water, as required by these regulations, for the number of persons which the boat will accommodate on the basis of 10 cubic feet per person. (46 C. F. R. 153.3, 153.6.)

***Precautions, tanks and containers—Existing boats.***—Properly constructed tanks or suitable metal containers are superior to wooden water breakers. In existing boats where it is intended to utilize air tanks by converting them to tanks for drinking water, care should be taken that these tanks are not painted on the inside with red lead or other lead-containing paint. Small amounts of lead in water gives rise to serious lead poisoning. There are available on the market several types of commercial one-gallon varnish or lacquer cans which can be obtained with proper protective coating on the inside. These cans will hold water in a pure and wholesome condition for many months without rusting or contamination of any form. Rust in itself in drinking water is harmless and even though plain tin cans are utilized and pin-point rust develops, the water can be drunk with

impunity. Where air tanks are removed and other water containers substituted, those that are tin should be properly protected on the outside to prevent rust and corrosion, particularly if they are rectangular cans stowed one on top of the other. They should, of course, be properly secured in the tank space and perhaps separated by thin battens or slats.

**Filling and sealing containers.**—In filling water containers such as the above-mentioned 1-gallon cans, it is desirable, if possible, to use boiling water. The cans should be filled within 1 inch of the top to allow for expansion and freezing and sealed while hot. This method drives off the dissolved oxygen and thereby prevents rusting. Water tanks of all kinds should be marked with their capacity in U. S. gallons. The marking should be permanent and legible at all times. Capacity marking will facilitate inspection.

**Changing water—Cleaning tanks.**—New water tanks should be carefully washed out to remove soldering acid, etc., in order that the water may remain sweet and potable. Water in lifeboats should be changed at frequent intervals.

**Water testing.**—When testing water in tanks for sweetness, shake the tank or agitate the bottom to stir up any sediment and dip to the bottom with a ration cup or utilize a glass tube long enough to reach the bottom. Hold the finger over the open end. This will bring up a sample of water from top to bottom of the tank or breaker (if it is still carried). Water in wooden breakers should be changed most frequently as, particularly in warm weather, there is a reaction between water and the wood which, while not harmful, does seriously affect the taste. In filling water tanks, try to get the best drinking water that is available.

**Securing bung plugs.**—It is apparent from an investigation of casualties that the explosion of torpedoes may, in the case of wooden water breakers, force out the bung plugs due to the concussion and consequent pressure on the outside of the breakers. This happened in the case of a tank vessel, and the shower of oil which came down covered the water breakers and seriously contaminated the supply of water in all the lifeboats. Where wooden water breakers are stowed in lifeboats, the plugs should be securely fastened in by means of a leather or canvas strap.

**Additional water supply.**—Supplies of water in the boats and rafts can be augmented by the use of buoyant metal containers filled with fresh water stowed on the deck of the ship and so arranged that they will float free of a sinking vessel. These containers should be marked in a distinctive manner in order that they may be readily picked up. Consideration should be given to providing rings or lashings in order that a line may be made fast to the containers. It has been suggested that such containers can be towed behind a lifeboat or raft and utilized as needed. Obviously such buoyant containers should not be of such size and weight that they cannot be handled alongside a boat or raft.

**Additional liquids.**—Where space in the lifeboat permits, additional liquids are recommended by the Committee on Nutrition of the National Research Council in the form of canned tomato juice or canned unsweetened citrus fruit juices. These juices will of necessity have to be stowed in their original factory containers as if they are opened and placed in any other container, they will spoil due to the action of the air. In lifeboats with floors, these fruit juices could be stowed under the floor. Fruit juices are superior to food when it is desired to carry same to augment the provisions and water required by the regulations.

### FIRST-AID KIT

**First-aid kit.**—One first-aid kit consisting of the equipment as listed below, packed in a substantial metal or otherwise suitable container. The container shall be watertight when closed and of substantial construction not easily damaged or rendered non-watertight. It shall maintain its watertightness when submerged at least 1 foot deep in water maintained at approximately 70° F. for a period of 2 hours. Items of equipment



in the first-aid kit provided for boats certified to carry 40 persons or less shall be as follows:

Two units, 1-inch adhesive compress, each containing 16 compresses.

One unit, ammonia inhalant, four tubes, each 2 cc. per tube, and four drinking cups.

One scissors, blunt.

One unit, gauze compress, 24 by 72 inches.

Two units, 3 ounces tannic acid jelly in not less than two tubes (10-percent tannic acid with 5-percent sulphadiazine).

One unit, three eye pads, adhesive strips, three tubes eye dressing not less than  $\frac{1}{8}$  ounce each.

One unit, three vials of iodine 10 cc. each.

One unit, 4-inch bandage compress.

Two units, four each, 2-inch bandage compress.

One unit, triangular bandage, 40-inch.

One unit, gauze bandage, 4 inches by 6 yards.

Two units, containing tourniquet and forceps.

One unit, splint-wire, or equivalent.

One dozen safety pins.

Where one unit is specified above, it shall be contained in a single carton of the dimensions set forth below. Where two units are specified, they shall be contained in two single cartons or one double carton of the dimensions set forth below:

	Length	Width	Depth
	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>
Single carton-----	4	$2\frac{7}{8}$	$\frac{5}{8}$
Double carton-----	4	$2\frac{1}{8}$	$1\frac{1}{4}$

**(46 C. F. R. 153.6.)**

**Care of injured.**—There have been many cases where it has become necessary to abandon ship with wounded or injured persons in the boats. Persons who are badly injured should be moved as little as possible and extensive first-aid treatment should not be attempted if it is apparent that surgical aid is necessary to take care of the man. He should be kept warm, but, of course, in the tropics shielded from the sun. Even severely injured men, unless suffering from loss of blood internally may survive for many days if able to take water.

**Shock.**—The medicine and accessories provided in the abandon-ship kit are furnished for the treatment of injured men and comment concerning their use will be found under that item of equipment. If an abandon-ship kit is not available in your lifeboat and there is a badly injured person aboard, he should be made as comfortable as possible and, as he will be suffering from shock, he should be kept warm by being wrapped in dry blankets, if available, and protected as much as possible from wind, sun, and weather.

**Cleansing wounds—Use of disinfectants.**—Prior to applying dressings, injured men's wounds may be washed with sea water to remove caked blood and dirt. Care should be taken in washing, however, to prevent surplus water from wetting his clothing unnecessarily. Do not pour any quantities of iodine or any other antiseptic into large open wounds. Use the sulfanilamide powder if an abandon-ship kit is available or if provided in the first-aid kit supplied to the lifeboat. Cloths or compresses soaked with sea water should be used on wounds or injuries which become infected.

**"Immersion foot" treatment.**—Reviews of casualties have revealed that in several cases the kindness and assistance of rescuers permitting survivors to get their feet warm has resulted in most serious consequences. Persons with "immersion foot" should not under any circumstances be allowed to warm their feet which are numb to the touch. Even though they may be physically able to walk, they should not be allowed to do so as the danger to the tissues may be very serious. The feet should be kept elevated. It may be necessary to continue the treatment for several days before normal circulation is restored. Obviously, however, the best preventive against "immersion foot" is to keep the boat as dry as possible at all times, thereby preventing the accumulation of any water.

**Massage oil.**—Massage oil can best be utilized to protect the skin from wind and water. Petroleum jelly or vaseline will be found useful for this purpose. Oil as a protection against sun, is nearly valueless. Oil is not suitable or intended for use in connection with what has now come to be known as a condition called "immersion foot," which is brought about by persons sitting for days with the feet and legs immersed in cold sea water. Subsequent experience and findings of British and American medical authorities have shown that oil or grease and/or massage is valueless in preventing or alleviating this condition. As a matter of fact, massage may do serious damage to the tissues and result in gangrene and perhaps the loss of a foot or leg. In attempting to determine the efficiency of various treatments, as well as to find the cause, extensive experiments were conducted with men sitting for various periods with bare legs, with rubber boots on, with shoes and stockings on, etc., in cold water. It was found that the condition was solely due to the cold alone and that a coating of grease, even one-half inch thick, provided no protection or benefit.

## CONDENSED FIRST AID

### BURNS—ACID OR ALKALINE

- (1) Flush burned parts freely with fresh water if available.
- (2) Apply solution of sodium borate from eye dressing packet.
- (3) Select proper size of compress to cover burn.

### BURNS—ELECTRICAL OR HEAT

- (1) Cover burned surface with burn preparation.
- (2) Select proper size compress to cover burn.

### CUTS, WOUNDS, ETC.

- (1) Apply antiseptic direct to wound and surrounding surface, using swabs.
- (2) Cover wound with proper size compress, holding it in place with bandage already attached.
  - (a) For minor injuries (finger, toe, hand, foot, wrist, or ankle) use 1-inch compress.
  - (b) For medium injuries (hand, foot, lower leg, or arm) use 2-inch compress.
  - (c) For large injuries (arm, leg, head, or body) use 4-inch compress.
  - (d) For extra large injuries, unfold gauze compress and hold in place with 4-inch bandage.

### CHEST WOUNDS

Any wound which penetrates through the chest and allows air to enter the chest may cause collapse of a lung and possible death.

To prevent this, large chest wounds should be made air tight as soon as possible by means of a large dressing tightly applied.

### HEMORRHAGE

- (1) Control hemorrhage by pressure of fingers.
  - (a) Arterial hemorrhage (bright red blood)—between heart and wound.
  - (b) Venous hemorrhage (dark red blood)—on side of wound away from heart.



(2) Apply tourniquet before releasing finger pressure.

(a) Arterial hemorrhage (bright red blood)—tourniquet between heart and wound.

(b) Venous hemorrhage (dark red blood)—tourniquet on side of wound away from heart.

#### CONTROL OF BLEEDING

Serious bleeding from an arm or leg can cause death in a very short time if not promptly controlled.

The first available tools for stopping serious bleeding are the hands, either of the person injured or of someone nearby whose services can be utilized. This is done by squeezing the arm or leg as hard as possible at the sites indicated in figure 5. By this method bleeding can be stopped while a tourniquet is being secured.

Remember: A man with his leg shot off can bleed to death in the 60 seconds it takes to secure a tourniquet.

However, such measures are necessary only in cases with spurting bright red blood, which comes from the larger arteries and is seen only in about one in a hundred wounds.

In cases with a steady moderate flow of darker blood, which comes from the veins, a dressing firmly bandaged over the wound will stop bleeding better than anything else.

Remember: A tourniquet often does more harm than good—use it only in cases with spurting bright red blood, applied above the wound tight enough to stop bleeding. Loosen the tourniquet every 15 minutes, but do not remove it. Do not tighten again if the bleeding has stopped.

#### DRESSINGS

All wounds in which the skin has been broken should be covered by a properly applied dressing, to protect the wound and keep out infection. By keeping out infection a life may be saved or time required to heal shortened by many weeks. While unwrapping and applying dressings **DO NOT TOUCH YOUR FINGERS OR ANYTHING ELSE TO THE SIDE OF THE DRESSING THAT WILL BE NEXT TO THE WOUND.** This is extremely important.

Bind the dressing firmly in place.

#### FRACTURES

(1) Cut away clothing from fracture, do not drag it off.

(2) Handle limb with utmost gentleness.

(3) Fold wire splint so that it is sufficiently long to project beyond the joints at the end of broken bones.

(4) Pad splint with gauze compress and apply with compress to flesh.

(5) Hold splint in place with 4-inch bandage so that limb cannot move.

The purpose of first-aid treatment of broken bones is to render them incapable of being moved. The jagged ends of the bone must be kept stationary to prevent further damage to other tissues while the injured man is being moved.

The first and one of the main principles in treating broken bones is that the bone shall be splinted where the accident occurs, before any transportation is done. The splints should extend beyond the neighboring joints.

This will have to be modified by conditions at the place where the injury occurs. If a man with a broken leg must be moved to get him out of the way, less harm will be done by dragging him than by attempting to carry him.

A man with a broken arm or collar bone should have a sling applied to the arm on the injured side and suspended from the neck. A fractured bone of the thigh should be held stationary by an outside splint reaching from the armpit to the foot and an inside splint from the crotch to the foot.

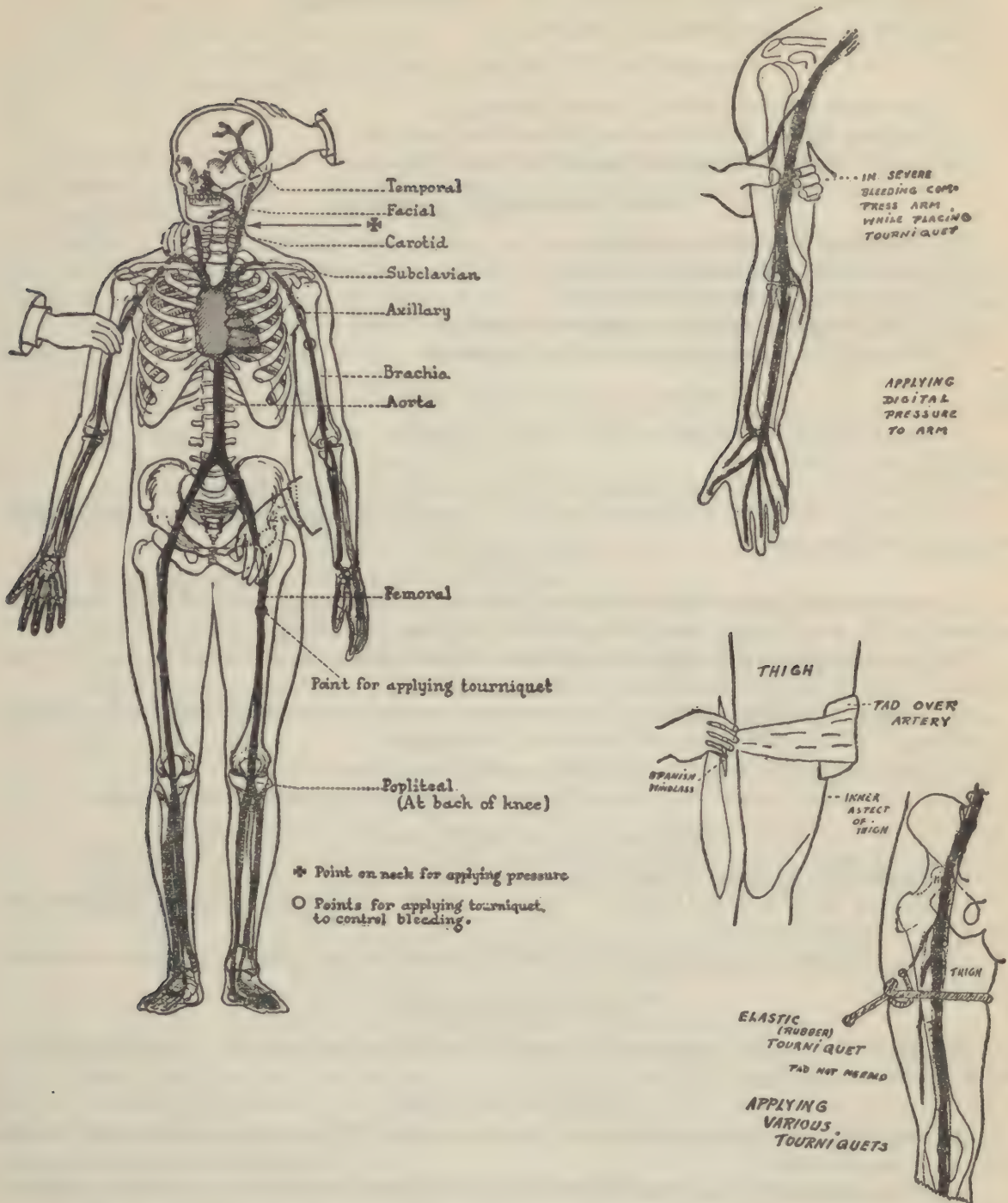


FIGURE 5.—Pressure points—Tourniquet applications.



## SPLINTERS OR FOREIGN SUBSTANCES IN BODY

- (1) Use Forceps to remove foreign body if end projects above flesh.
- (2) Under no condition attempt to "dig out."

## SPRAINS OR INJURIES WHICH DO NOT BLEED

- (1) Use 4-inch compress placing pad over injury.
- (2) Bandage tightly, but use care not to stop the circulation.
- (3) Elevate the injured part and keep it free from all motion.

## CARBON MONOXIDE (CO) POISONING

- (1) Get patient into fresh air quickly.
- (2) Keep patient comfortably warm.
- (3) If breathing, use ammonia inhalent.
- (4) If not breathing, start prone pressure method of artificial respiration.
- (5) After patient is conscious, give spirits of ammonia.

## FAINTING OR UNCONSCIOUS FROM ANY CAUSE

- (1) Lay patient flat on stomach, head turned to one side.
- (2) Loosen clothing.
- (3) If breathing, break ammonia inhalent under nose as directed on package.
- (4) If not breathing, use prone pressure method of artificial respiration. Use ammonia inhalent as soon as breathing starts.

## SHOCK

In every severe injury the body always suffers a certain amount of shock, which is often more serious than the wound which caused the condition, and may cause death.

The injured person is pale, feels cold and damp, and has a fast weak pulse when he is in a state of shock. For an injured person in shock, treatment consists of:

- (1) Keep in lying down position with feet elevated and head low except when there is an injury to the head. With a head injury the head should be elevated.
- (2) Keep warm with blankets or any other available method.
- (3) Relieve pain; if available, give morphine. Dosage:  $\frac{1}{4}$  grain syrette every 3 hours.

## DIRECTIONS FOR GIVING MORPHINE

- (1) Remove the transparent shield from end of syrette.
- (2) Holding the wire by the loop, push wire through the needle into the syrette, thus breaking the seal. Withdraw the wire.
- (3) Stick the needle under the skin of the arm or shoulder, at an angle of  $45^{\circ}$  and squeeze syrette until tube is flat.

## ARTIFICIAL RESPIRATION

Aid to breathing may be necessary in cases of immersion, electric shock, concussion shock, or being overcome by smoke.

## FOLLOWING IMMERSION

- (1) Lay on belly with head on folded arm, face to one side. Wipe water and mucus out of mouth and pull tongue forward.
- (2) Spread legs and kneel astride thigh on side to which head is facing (so as to be able to observe face).
- (3) Place palms of hands on lower ribs. Let your weight go forward on hands, with elbows held stiff, for count of—one thousand one, one thousand two, one thousand three. Then drop backward and release pressure for count of—one thousand one, one thousand two.

(4) Repeating this procedure will compress and release the chest 12 times per minute. Continue for at least 2 hours before giving up hope.

(5) Persons giving artificial respiration should be careful not to throw their weight forward on the ribs of the unconscious person with such force that they crack his ribs. This has happened in several instances. Be careful.

### FISHING KIT

**Fishing Kit.**—On every ocean vessel of over 3,000 gross tons there shall be provided in each lifeboat one approved fishing kit consisting of the following equipment:

1 pair gloves, cotton, commercial grade.

1 knife, 2 in. high carbon steel blade, thickness of blade 0.060 in., tempered to test .56 to .60, well riveted into a wooden handle 6 in. long, 3/4 in. wide by 1/2 in. in thickness. Handle to be smooth and shaped, with a 1/4 in. hole in end for attaching 3 ft. of 10-pound cord. Knife must be able to float. Blade to be guarded with a water-proofed paper tube 5 1/4 in. long by 5/8 in. inside diameter.

1 package containing the following items:

1 sinker, egg-shaped, with 7/64 in. hole in center, weight 2 oz., with 3 ft. of 10-pound cord attached to wooden handle containing the abrasive stone.

1 dozen pork rinds, dehydrated strips 4 in. long, 1/2 in. wide, ends tapered to approximately 1/8 in. and rounded, one end to have two hook-holds cut 3/8 in. and 7/8 in. from end respectively.

1 # 1/0 O'Shaughnessy hook, attached to 6 in. of # 9 stainless steel wire, other end attached to a # 5 barrel swivel.

1 # 3/0 O'Shaughnessy hook attached to 6 in. of # 9 stainless steel wire, other end attached to # 5 barrel swivel.

1 # 7/0 O'Shaughnessy hook attached to 6 in. of # 9 stainless steel wire, other end attached to a # 2 barrel swivel.

1 # 2 O'Shaughnessy hook, attached to 6 in. of # 5 stainless steel wire, other end attached to a # 5 barrel swivel.

1 # 6 O'Shaughnessy hook equipped with 3 in. of # 5 stainless steel wire, other end attached to a # 5 barrel swivel.

1 abrasive stone, size 3/4 in. x 1 7/8 in. x 1/4 in., firmly cemented with waterproof cement into a wooden handle of sufficient size to make the unit buoyant. A 1/4 in. hole shall be in the end of the wooden handle, with 3 ft. of 10-pound cord attached.

NOTE: All of the hooks in this package shall be firmly attached to a piece of tapered cork, 1 in. x 3/4 in. diameter maximum and attached to the wooden handle containing the abrasive stone.

1 set of instructions shall be printed on PAR-A-PAR paper.

1 dip net, 12 in. deep by approximately 16 in. across the top and bottom when folded flat. Cotton mosquito netting mounted on 12 gauge galvanized market wire. Ends of wire to be securely fastened in a round wooden handle 4 in. long by 1 in. in diameter, tapered both ends. Over-all length of net folded not over 16 in., to be folded once to approximate packing length of 8 in.

3 ft. of 10-pound cord to be attached to the handle and the front end of net.

1 fishing rig # 1, 1/8 in. winder, pressed wood or equivalent, containing 100 ft. of Ashaway 15-pound nylon line or equivalent; 1 # 6 O'Shaughnessy hook rigged with 3 in. # 5 stainless steel wire and a # 5 barrel swivel attached. A split buck shot mounted on line about 6 in. above hook.



1 fishing rig # 2, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of # 12 Ashaway white cotton shore line, or equivalent. Equipped with a stubbed mackerel squid jig mounted on a 1/0 O'Shaughnessy hook equipped with 6 in. of # 5 stainless steel wire with a # 5 barrel swivel attached. (NOTE: Hook on this line should be light colored.)

1 fishing rig # 3, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of # 24 Ashaway white cotton shore line, or equivalent. Equipped with a 1-ounce feather jig with white rubber skirts, chrome plated head, rigged with a 3/0 O'Shaughnessy hook with 24 in. of # 9 stainless wire leader and a # 5 barrel swivel attached.

1 fishing rig #4, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of #24 Ashaway white cotton shore line, or equivalent; equipped with a #1/0 O'Shaughnessy hook on 5 in. #9 stainless steel wire with #5 barrel swivel attached. A 2-ounce egg-shaped lead sinker with a 7/64 in. hole mounted on a line about 18 in. above hook with knot tied above and below lead.

1 fishing rig #5, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of #24 Ashaway white cotton shore line, or equivalent. Equipped with a #7/0 gang hook and a 1-ounce egg-shaped sinker, with 7/64 in. hole. Mounted on the line so that this sinker lies directly under the hooks.

1 fishing rig #6, 1/8 in. winder, pressed wood or equivalent, with 100 ft. #48 Ashaway white cotton shore line, or equivalent, equipped with 1 1/2-ounce feather jig rigged with a 6/0 O'Shaughnessy hook on 2 ft. of #9 stainless steel wire and #2 barrel swivel.

1 fishing rig #7, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of #48 Ashaway white cotton shore line, or equivalent. Equipped with a specially constructed spear of approximately 7 in. overall in length, special constructed barb on one end with an open eye on the other end, and a "U"-shaped attachment brazed to the side of the spear to accommodate blade of oar or paddle. This item should be constructed of a good grade of commercial steel, the barb to be rounded at the end and back to be concave; protected with a water-proofed paper tube to be 4 3/4 in. long and 5/8 in. inside diameter.

1 bib, width across bottom 28 in., width from end of flap to end of flap, 36 in. Width across the top 30 in. Length from top of bib to bottom, 15 in. Bib shall contain 12 pockets in which each of the items shall be inserted. All of the edges shall be hemmed and double stitched. Fastened to the end of the left-hand flap shall be a rayon tape 18 in. long by 1/8 in., securely sewn. Fastened to the right-hand flap shall be 2 rayon tapes, 18 in. long by 1/8 in., securely sewn. 7 1/2 in. from each corner of the top of the bib shall be firmly sewn a rayon tape 24 in. long by 1/8 in. The bib shall be made of olive drab cotton cloth, herring-bone twill, weight per square yard 8.5, minimum thread count per inch in warp 72, in filling 46; breaking strength in warp 125 pounds, in filling 85 pounds. The test to be made by 1 x 1 x 3 Grab Method.

All material shall be packed in a metal waterproof key opening can. A 3/4 in. ring which shall hinge back flat shall be soldered on the bottom of the container.

NOTE: Each rig shall be marked with saw-cuts on both sides of winder for identification. All hooks and swivels to be attached with at least 6 turns of the wire. All lines attached to swivels with a surfman's hitch with three wraps. All fishing hooks to be bound to rigs with scotch tape. (Approximate weight of kit, packed, 3 1/2 pounds.)

The container shall bear the manufacturer's name or trademark, together with the following inscription:

**"EMERGENCY FISHING KIT  
OPEN ONLY FOR ACTUAL EMERGENCY USE"**

NOTE—See figure 5A.

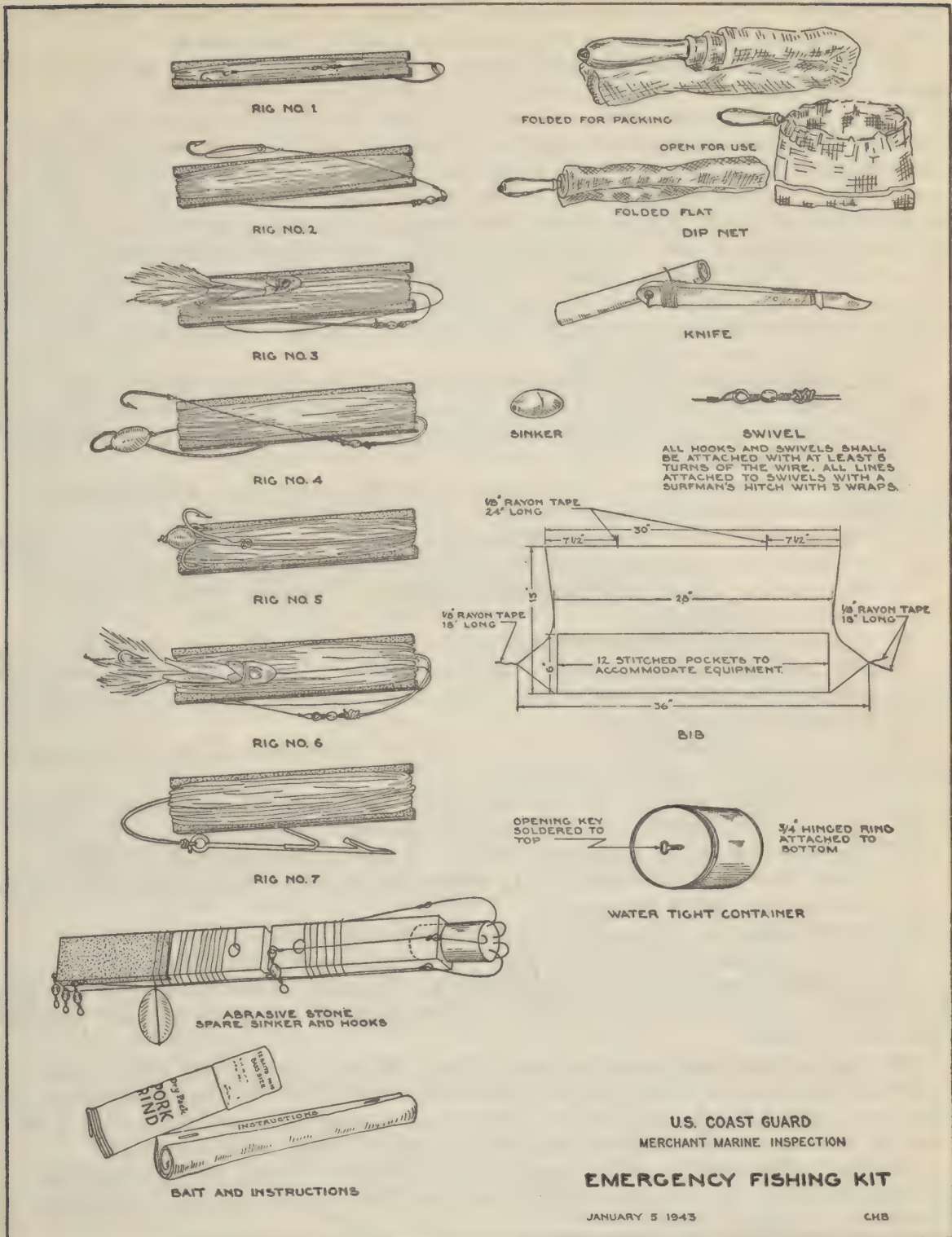


FIGURE 5A.—Emergency fishing kit.



**Fishing instructions.**<sup>1</sup>—Read these instructions with care. Follow them. They may spare you much needless suffering, or even save your life. Keep cool and use your head. Steadiness and good temper have got many a man out of the same fix you are in. Never give up.

The fishing tackle in this kit has caught fish for others all over the world. It should catch fish for you. Be careful of it. Your life may depend on how you protect it and use it.

**Fish is food and drink.**—If you can catch fish, you will not die of hunger or thirst. The flesh of all fish caught in the open sea is good to eat, cooked or raw. It is healthful and nourishing. Many tribes and some nations commonly eat fish raw, and like it. After you have eaten what you need, the juice of offshore fish, squeezed out or chewed out, is good to drink. No one who can catch fish need suffer from thirst. Fish juice tastes much like the juice of raw oysters or clams. The Navy has tested it and found it safe. To squeeze the juice out, take a piece of the flesh without bones or skin and cut it up fine. Wrap the meat in some kind of cloth, leaving long ends, and let two men twist the ends hard. The juice will drip out. To chew the juice out, put a piece of fish in your mouth and chew it small. Suck out the juice and swallow it, then spit out what is left. Keep it up so long as you are thirsty and have fish.

**Twelve general rules when fishing.**—(1) Never make your lines fast to your finger, hand, or foot, or to your boat. A big fish might cut you, or break your line and carry off your tackle.

(2) Let another man hold the end of your line while you are fishing. That gives you two chances to save your tackle and catch your fish.

(3) Do not rush to the side of the boat when somebody else catches a fish, or let others do it. If that happens, a boat in a seaway may be upset.

(4) Try to catch small fish rather than large ones. Big fish, such as large sharks, may break lines, carry off baits, cut your hands, and make other trouble, or even upset your boat.

(5) Be sure to keep a part of any bird or fish you catch to use for bait. Fresh bait is better than the pork rind in your fishing kit.

(6) After using, clean your hooks and lines of fish and fish slime. Wind them up again as they were in the kit, see that hooks are not sticking into lines, dry them in the sun, return them to the cloth pockets, and keep them dry if you can. While drying, always slide your jig up the wire to keep the feathers from rusting against the hook.

(7) Keep your fishing tackle in a safe place or lash it in, when not in use, so that it cannot be lost overboard, even if your boat should turn over.

(8) Be very careful not to get your lines tangled or to let hooked fish tangle them. Two men, one at side, one at stern, can fish at the same time, but they must watch out.

(9) Keep your bait moving to make it look alive. A moving bait is better than a still bait.

(10) Never leave your line where it can be stepped on, and keep it from wearing itself out by cutting into or rubbing against the gunwale.

(11) Be sure every man in your company gets his fair share of whatever you catch.

(12) Keep on fishing and watching for fish. You never know when a fish may bite.

**Fishing tackle and how to use it.**—Put one man in charge of this tackle. Let him wear the cloth case as an apron when in use. When not in use, keep it all together in the case. Never let it get scattered about.

**Rig No. 1—Hook and line.**—The length of line is 100 feet. Bait the hook with a small piece of pork rind (contained in the Kit), as wide as across the bend of the hook, and a little longer. If fish are very small, make the bait small too. If you have nothing better, slip or tie a white or pearl button off your shirt on the hook and keep it moving, sometimes slow, sometimes faster.

**Rig No. 2—Mackerel jig.**—The length of line is 100 feet. Before fishing, scrape metal of jig until it is bright. Troll (drag) this jig behind your boat when in motion. It is intended to imitate a fish. Keep it moving.

<sup>1</sup> In these instructions the word boat means lifeboat, life raft, life float, rubber boat, tender, dory, or any other lifesaving vessel.

To use a jig without bait, let out 25 or 50 feet of line. But if fish do not bite, hook through one end a 2-inch piece of pork rind or a narrow strip of white or light-colored cloth or canvas, or make it fast to the eye of the hook. A narrow strip cut from the white belly of a fish is excellent, or a small live fish may be best of all. Hook the fish through the back and let it run.

When you have caught a fish or a bird, a small piece of fish or meat is usually better than pork rind bait. If you have no other bait, cut from your shoe a small, narrow strip of leather or canvas, an inch long for small fish, longer for bigger fish. Hook it through one end and keep it moving.

When your boat is not traveling through the water fast enough to keep the jig near the top, let it sink to different depths and keep pulling the line in, either steadily or with jerks. Try both.

When the boat is moving too slow to keep jig near surface, take hold of the line about 4 feet from the jig, whirl the jig around your head on the short line and cast it far out. Then pull in as fast as you can, either steadily or in jerks. But first see that the end of the line is firmly held by another man, and that no one will be hit by your whirling jig.

The jig can also be used for deep fishing with pork rind bait or a piece of fish or bird. Try it at different depths.

**Rig No. 3—Feather jig.** Same instructions as for Rig No. 2.

**Rig No. 4—Hook, line, and sinker.** For bait fishing near the boat or deep down, bait the hook with pork rind, fish, or meat. If you let this line down full length and get no fish, tie another line of about the same size to it securely and try deeper. If the lead now on the line will not sink it, use extra lead also.

**Rig No. 5—Grapple for snagging fish.** Very useful if you have no bait, or if fish will not bite. When fish are around or close to the boat, throw this grapple beyond or among them, or drop it near them, and jerk it sharply to hook them.

**Rig No. 6—Feather jig.** Same instructions as for Rig No. 2.

**Rig No. 7—Small harpoon or spear.** Very useful for taking small sharks, turtles, and fish that will not bite. Also for birds that light on the boat or swim nearby.

Let another man hold the end of the line tied in the eye at the end of the shaft. Hook the offset in the middle of the shaft over the end of an oar blade. Hold the line tight in one hand to keep the harpoon in place. Jab with this harpoon. Do not throw it. With a knife you can shape either end of an oar or paddle, or a boathook, or stick of wood, to fit this harpoon.

When you have struck and a fish is fast, be very sure to throw the oar, boathook, or other handle, back into the boat. Otherwise you might lose it. Then fight your fish with the line.

If a big fish is hooked and is fighting the line near the boat, harpoon it quickly. You will have a double chance to save it. Be very careful not to harpoon sharks or other fish too big to handle.

**Other articles in the kit.**—Pork rind bait. Very important. It will turn white in the water. Do not waste or lose this bait. Use it as directed.

Dip net. Very useful to catch small fish for bait or food. Unfold and open out. Move net slowly under the fish, and then lift. Do not untie either line. Hold line at front of net in left hand and use it to pull net through water while holding handle in right hand. If it falls overboard, this net will not float. Do not eat small crabs and shrimps that gather around a light at night and sometimes are so thick they turn the water red, unless you have plenty of fresh water. They are salty and will increase thirst.

Knife. Keep a lanyard fast to the knife and tie other end when in use. If it falls overboard, this knife will float.

Whetstone. Keep your hooks sharp. Dull hooks catch less fish.

Spare hooks ready to tie on line, and extra lead.

Gloves. To protect your hands from being cut by the line or when handling fish in the water or in the boat. Otherwise the line may hurt your hands badly. Many fish have sharp fins. The safest place to hold a fish is just behind the head or just above the tail.



**About fishing.**—(1) Do not forget that as a rule fish bite better at a moving bait. If the boat is moving slowly, one man can fish deep and another troll at the same time.

(2) Fish do not bite well at a hook with seaweed on it. Watch your hooks and keep them bated and clear.

(3) If you hook a fish too big to handle, give him as little line as possible. That way you will have more line left after he breaks it.

(4) Watch for schools of fish. You may see them breaking water. Large fish will probably be near schools of small fish. Get up to such schools if you can.

(5) If you have some fish to spare, you can often catch more by chumming. Cut pieces of fish very fine, and scatter them in the water. Chum only if the boat is moving slowly or not at all. Chumming may bring birds also within reach of baited hook, net, or spear.

**Fishing with a light.**—Fish often come to a light at night. If you see flying fish, at night hoist your sail or hang up your shirt or any other white cloth. Shine the light of your flashlight on it. Flying fish will often jump at it and fall into the boat. But be careful not to use your flashlight unnecessarily unless you have several. Often the bright moon shining on the white cloth will draw the fish.

A light thrown on the water at night will sometimes bring flying fish and other small fish. Catch them with your net. They are good to eat.

**Dried fish.**—To dry fish, cut it in thin, narrow strips, and hang it in the sun. If well dried and kept dry, fish will often stay good several days and you may like it better when dried. To dry small fish, a foot long or less, clean, take out the backbone, cut slits across the inside about a quarter inch apart, and hang in the sun.

Important. Fish not cleaned may spoil in half a day. Clean your fish and eat it or dry it without delay.

**Sharks.**—Do not eat shark liver or shark meat unless you have plenty of water. It is salty and will make you thirsty.

Sharks have killed many men. Stay out of the sea and in the boat when sharks or other large fish are around. Many a man has lost hand or foot by letting it hang overboard. Splashing with an oar or striking at it will usually drive a shark away. The tenderest spot in a shark is the end of his nose. His gills come next.

Do not fish when sharks are around. They may cut your lines. Let sharks alone if you can get other fish. Never harpoon a big shark. The best place to harpoon a small shark is just behind the fin on its back. Harpooned sharks often roll over on the line and try to bite it. Fight them hard and keep the line taut. A bitten line means a lost harpoon.

Clean your shark as soon as you catch him. This is important.

**Turtles.**—The whole meat, blood, and juice of a turtle are good to eat. There is good meat against the shell under the backbone. Cut through the ribs to get it. After a turtle's head is cut off the head may bite and the claws may scratch. Watch out.

If a turtle comes near your boat, try to snag it by throwing your grapple or a fishhook across it where the hook will catch in leg or neck, or in the edge of the shell. Better still, use your harpoon and strike the shell hard. Swimmers have caught turtles in the sea by turning them on their backs and towing them to a boat. Hot sun brings a clear oil out of turtle fat. Dip your food in it.

**Seaweed.**—Certain kinds of seaweed are good to eat. Try it. No seaweed is poisonous. Chew it up fine and swallow it.

A bunch of seaweed often holds small fish and crabs. Lift it out slowly and carefully, and shake it over the boat. Chew out the juice of the crabs, swallow it, and spit out the shells. But eat no crabs unless you have plenty of water. Also, be sure you pick out all little jellyfish that might be among them. Jellyfish are often poisonous.

**Eels and snakes.**—Eels are fish and good to eat. But be careful not to mistake sea snakes for eels. Sea snakes are found only in the Pacific and Indian Oceans. They have scales. Eels do not. Eels swim under water, snakes mostly on top. Sea snakes are poisonous. Let them alone.

**Poisonous fish.**—When you catch fish near the shore, or when fishing from the land, watch out for three kinds which are poisonous. One is a parrot fish, with large teeth like a parrot's beak. The others, porcupine fish and puffer fish, will swell up like a balloon if you scratch them on the belly. You can use them for bait, but be very sure not to eat them.

**Whales.**—Do not worry about whales. The chances are millions to one they will do you no harm.

### FLASHLIGHT

**Flashlight.**—One approved flashlight contained in a portable, watertight metal case. The flashlight shall be of all-metal, rugged construction, of focusing type with a reflector head of about 2 inches in diameter. One extra lamp shall be provided for the flashlight. Three extra 3-cell approved flashlight batteries in a waterproof package shall also be provided.

The batteries for the standard 3-cell type shall be of the sal ammoniac type with depolarizer. They shall have a nonspillable electrolyte and be free from leakage during the useful life of the cell. They shall be of the tubular construction, comprising three cells assembled in line, end to end in a suitable close-fitting tube or jacket of news, chip, or strawboard. The brass cap on the carbon rod and the zinc bottom of the cell shall serve as the terminals. The batteries shall be marked with the trade name of the cell, the name of the manufacturer or trade-mark number, or other designations of size, the date of manufacture, and the date of expiration of a guaranteed period for U. S. Marine service.

The batteries shall not be continued in use for lifeboat equipment for a period exceeding 1 year from the date of manufacture.

The flashlight batteries allowed under this specification shall be of a quality to meet the National Bureau of Standards tests as to voltage, capacity, delayed service tests, and required performance. (46 C. F. R. 59.11, 153.6.)

**Approved flashlights.**—Names and descriptions of flashlights approved for marine use will be found in a list of approved equipment contained in this publication. Flashlight batteries are marked with the date of manufacture and the date of expiration of guarantee for marine use. Several watertight flashlights are now being developed which will be available shortly.

### GRAB RAILS

**Grab rails.**—Grab rails or other suitable means shall be substantially attached to each lifeboat, below the turn of the bilge, where practicable. Grab rails shall extend approximately two-thirds of the length of the lifeboat. Where wires or manila ropes are attached to the lifeboats in lieu of grab rails, they shall be so arranged that they may be detached when the lifeboat is waterborne. (46 C. F. R. 153.3.)

**Arrangements—Precautions.**—This regulation provides means of clinging to an overturned boat as well as making available a grip on which to exert a turning effort in order to right it. Manila lines fitted in the fore and aft direction together with the girth lines, all as shown in figure 6, are found to be extremely satisfactory. On vessels carrying lifeboats fitted with rod or pipe grab rails, care should be taken to provide covering plates or bars for the water way on the boat deck in order to prevent any possibility of the grab rail catching in the upper edge of the fashion plate forming the outer coaming. Several cases have come to the attention of Headquarters where this has happened during abandonment due to enemy action. Ends of metallic grab rails should be faired to prevent fouling with lifesaving nets or other lines.

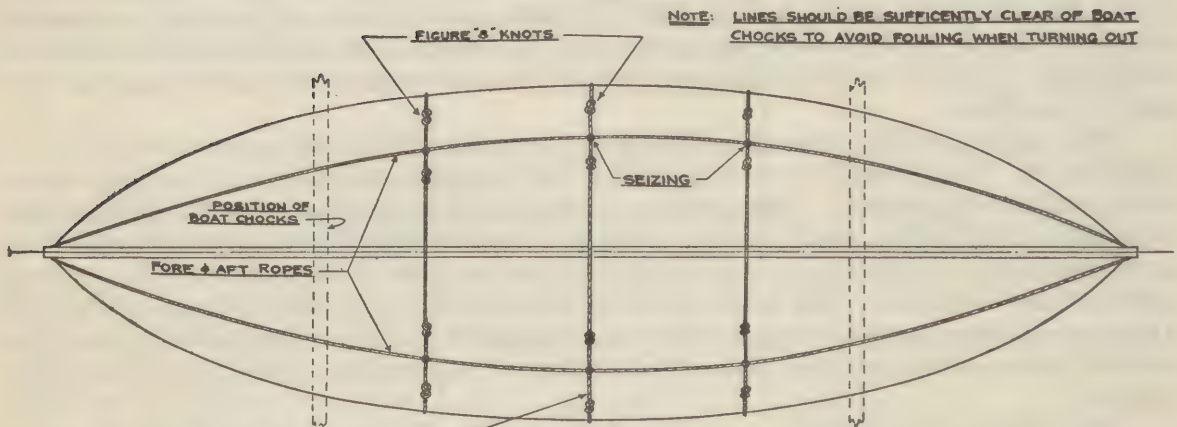


SKETCHES SHOWING ACCEPTABLE ARRANGEMENT OF ATTACHING  
GRAB LINES, AND GRAB RAILS AS REQUIRED BY-

SECTION 153.3 (4), SUB CHAPTER Q  
TITLE 46

PLAN OF UPTURNED BOAT

DRAWING NOT TO SCALE



GIRTH LINES TO BE SUFFICIENT  
IN NUMBER AND SO SPACED TO  
HOLD GRAB ROPE ADEQUATELY

GIRTH LINES TO BE RIGGED WITH  
SUFFICIENT SLACK TO ALLOW EASY  
GRIP BETWEEN BOAT AND LINE AT  
ALL TIMES.

NOTE: LINES TO BE DETACHABLE  
AFTER LAUNCHING

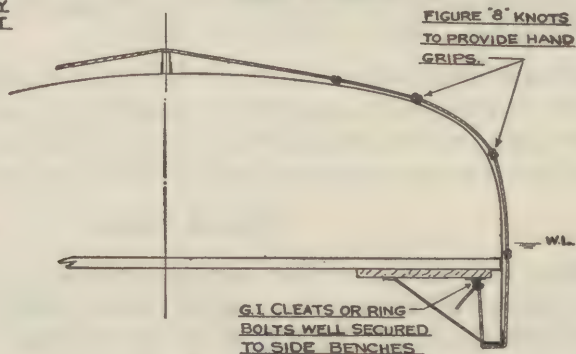
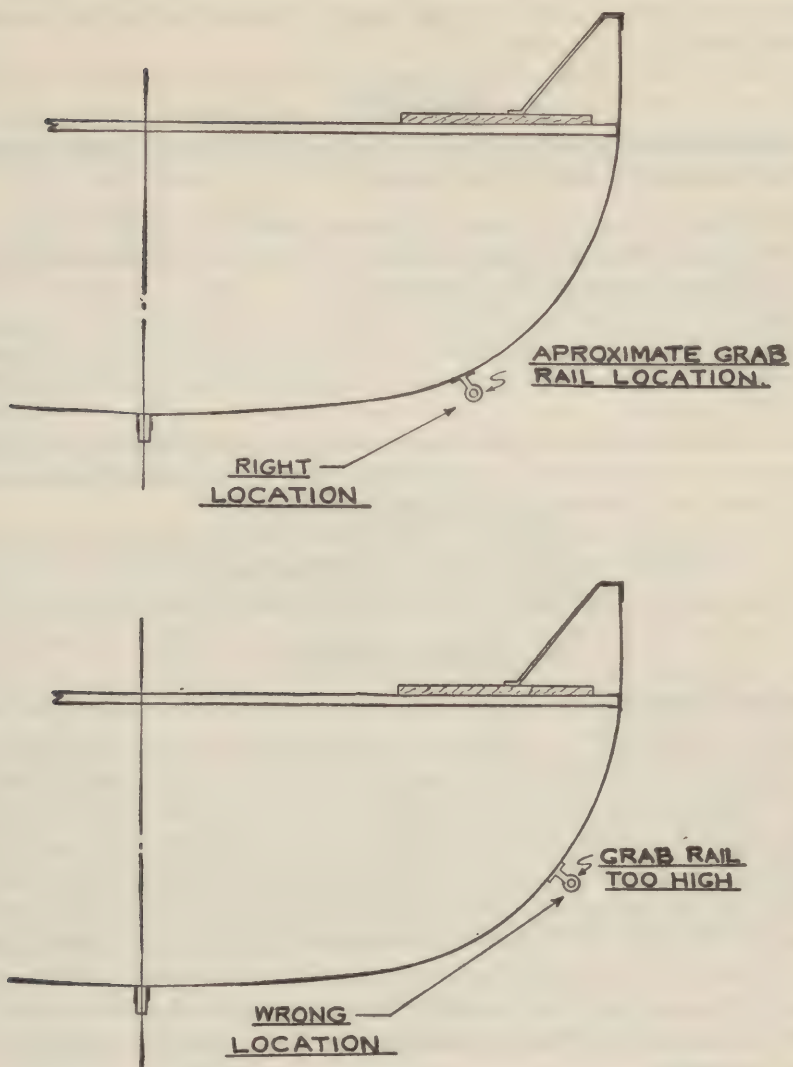


FIGURE 6.—Lifeboat grab rails and lines.

POSITION OF GRAB RAILS



U.S. COAST GUARD  
 MERCHANT MARINE INSPECTION  
 SEPTEMBER 1942

FIGURE 6A.—Position of grab rails.



**Lives saved.**—Grab rails or their equivalent have already been responsible for saving many seamen's lives during the present war. In one casualty alone, 4 men clung to an overturned boat all night, righted it at daybreak, bailed it out, and proceeded to rescue 22 other men adrift in the water.

**Righting upturned boat.**—The righting of an overturned lifeboat is not difficult to accomplish. All that is required is a group of men taking a constant strain on the girth lines and at the same time taking advantage of the wind and sea.

### HATCHETS

**Hatchets.**—Two single-edged hatchets attached by lanyards and readily available, one at each end of the boat. (46 C. F. R. 59.11.)

**Type—Dimensions.**—Hatchets for use on lifeboats should be of the hunter's type, hammer forged, with hickory handles of suitable size and shape to provide a comfortable grip for the hands and conform to the following approximate dimensions:

Cutting edge.....	3¼ inches.
Cutting edge to head.....	5 inches.
Weight without handle.....	1½ pounds.
Length over all.....	14 inches.

**Lanyard.**—It has been found advantageous to have a lanyard not less than 6 feet in length attached to the hatchet and the boat so that the hatchet may be used quickly in an emergency without detaching the hatchet with attendant risk of losing it overboard.

**Brackets.**—Brackets should be fitted at the side at each end of the boat to receive the hatchets and so secured as to prevent the hatchets unshipping themselves.

**Care.**—Hatchets should be kept free from rust and sharpened to a keen edge.

### ILLUMINATING OIL

**Illuminating oil.**—One gallon illuminating oil in metal container (46 C. F. R. 59.11.)

**Kind of oil.**—This oil should be (a) long-time-burning illuminating oil, Federal Specification, BB-O-381; (b) kerosene oil; or (c) 300° mineral seal illuminating oil; all of which should be of a flash point above 110° F. These illuminants are recommended for use in lifeboats in the order enumerated.

**Fouled oil in lantern.**—Survivors of the *Robin Moor* found difficulty keeping their lifeboat lantern burning because the illuminating oil was apparently contaminated with water. This condition could arise through "breathing" of the container when partially full. The damp air inhaled caused condensation on the inside of the can and consequent accumulation of water which will settle to the bottom. This can best be avoided by keeping the illuminating-oil container full. The contents should be emptied into a clean basin now and then to determine that it is in good condition and free from any water accumulation. When ordering oil for lanterns, illuminating oil should be specified—not just plain kerosene.

### LANTERN

**Lantern.**—One lantern containing sufficient oil to burn at least 9 hours and ready for immediate use. Two additional lamp wicks in waterproof container. (46 C. F. R. 59.11, 153.6.)

**Types.**—Lanterns to be suitable for lifeboat use should be weatherproof and fitted with heat-resisting, clear, not easily broken glass. While oil-burning, hand globe lanterns are acceptable for use in lifeboats, other types of lanterns such as the deck and the boat signal lanterns possess features which might prove preferable for constant hard use in a lifeboat. The boat signal lantern, which is enclosed and fitted in front with a cylinder and lens, emits a higher intensity of light in the desired direction and prevents unnecessary glare.

**Lamp wicks.**—Lamp wicks should be of high-grade cotton about 6 inches long and  $\frac{3}{8}$  inch thick and of appropriate width.

**Stowage.**—In no case should lanterns be carried in buckets. Lanterns should be stowed in the gear locker or properly stowed under thwarts.

### LIFE LINE

**Life line.**—A life line or grab line properly secured the entire length on each side, festooned in bights not longer than 3 feet, with a seine float in each bight. The life line shall be of a size and strength not less than 12-thread manila rope, and the seine float in each bight shall hang to within 12 inches of the surface of the water when the boat is light. (46 C. F. R. 59.11.)

**Methods of securing.**—The fastening of life lines on the top side of the side benches just inside the hull by means of staples is to be discouraged. While some may contend that this type of fastening is adequate, the action of the gradual rusting of the staples over the line and the cutting action of the staple combine to cause rapid deterioration. A line can be more properly fastened by means of small rings fastened inside the boat or by being rove through proper holes drilled in the side benches.

**Care of life lines.**—Life lines should be watched for deterioration and dry rot. Seine floats should not be checked or split.

### LIFE PRESERVERS

**Life preservers.**—Two life preservers. These life preservers are in addition to the vessel's equipment of life preservers. (46 C. F. R. 59.11.)

**Use as life buoy.**—Although the officers and crews on ocean and coastwise merchant vessels are instructed to wear their life preservers at all times when outside inland waters, the above requirement that two life preservers be provided in each lifeboat is of great importance. There have been several cases during the present war where men successfully got away in a lifeboat and saw two or three of their shipmates in the immediate vicinity. The conditions were such as to preclude their reaching them in the boat in time to prevent their drowning. The manila line which is provided by these regulations as part of the emergency equipment of each lifeboat could be utilized in the nature of a heaving line and made ready for use together with a life preserver by making it fast to the preserver in such a way that it may be tossed to a man in the water. In several instances men were lost who could have been saved, had their shipmates had available and remembered to use such accessory equipment.

### LOCKER

**Locker.**—Suitable locker or box for the storage and preservation of the small items of equipment. (46 C. F. R. 59.11.)

**Construction.**—Lockers or boxes should be watertight and constructed of good quality wood or metal of such form, dimensions, and so compartmented as to easily accommodate the items of equipment which are to be stowed therein. Such locker or box should be securely attached to the inside of the boat to prevent it or its contents coming adrift in the event the boat is swamped or capsized.

**Arrangement.**—Due to the increased items of equipment required and the varied types and arrangements of boats, no definite or all-inclusive recommendations can be made for stowage and arrangement of equipment and this matter must be left to the personnel in charge of the boats. It is desirable that all equipment and provisions be so arranged in locations as to be visible. Equipment should not, however, be stowed where it will interfere with the handling of the boat or where it is liable to be damaged. If stowed under thwarts, benches, or in hidden locations, suitable exterior



markings should be provided indicating such stowage. Lockers and boxes should have marked thereon all the items of equipment that are stowed therein. All equipment should be securely lashed or otherwise attached to the interior of the boat so as to prevent loss due to swamping, capsizing, or other accident.

**Equipment in locker.**—It is recommended that the following items of lifeboat equipment be stowed in the locker:

Signal flag.	Matches.	Drinking cups.	Extra batteries.
Ditty bag.	Compass.	First-aid kit.	Extra wicks.
Bullet plugs.	Signaling mirrors.	Lantern.	Fish kit.

### MANILA LINE

**Manila Line.**—Thirty fathoms of 15-thread manila line. (46 C. F. R. 153.6.)

**Use—Substitutes.**—This requirement is intended to provide an additional small line for general use in a lifeboat. Due to the fact that manila may not be available, any type of sisal or other suitable hemp may be accepted if approximately equal in breaking strength and handling qualities. This line will serve its purpose better if tarred and prepared as a heaving line while stowed in the boat. It can be used in conjunction with a life preserver or alone to rescue men in the water or for other purposes to which a heaving line is adapted.

### MAST AND SAILS

**Mast and sails.**—A mast or masts with at least one good mainsail and one suitable jib with proper gear for both, the sails and gear to be protected by a suitable canvas cover. New sails for lifeboats, as well as replacements for existing sails, are to be red or chrome yellow in color for the purpose of increasing their visibility on the water and from the air. Where a vessel in the North Atlantic north of 35° north latitude is provided with a radiotelegraph installation, only one of the lifeboats on each side of the vessel shall be required to be so equipped. (46 C. F. R. 59.11, 153.6.)

**Inapplicability of peacetime exemptions.**—The above peacetime requirement that only two lifeboats, one on each side, shall be equipped with mast and sails on vessels fitted with radiotelegraph installations, while on voyages in the North Atlantic north of 35° north latitude, should not be given any force or effect during the present war for the reason that vessels are no longer operated on established lines and may be diverted to voyages where this exemption does not apply. All boats, including those fitted with motors and hand-propelling gear, should, for the duration, be provided with mast and sail.

**Rig, area, and quality of sails.**—Diagrams showing the details and recommended dimensions and areas of sails, together with the recommended quality of sail canvas for the various sizes of lifeboats, is shown in figures 7 and 7A. Masthead fittings of sails should be of wrought iron or cast or sheet steel. Cast iron is not suitable for this purpose.

**Mast stays.**—Each mast should be fitted with one forestay and two side or back stays of suitable size, preferably of wire.

### MATCHES

**Matches.**—Three boxes of friction matches in watertight containers and carried in a box secured to the underside of the stern thwart, or stowed in locker. (46 C. F. R. 59.11, 153.6.)

**Type of container.**—Containers provided for the matches should be of a type which may be opened and resealed watertight again in order that matches may be used and replaced again in a dry container. Matches should be frequently checked for dryness. Containers unless airtight as well as watertight will “breath” with the result that the matches will become damp.

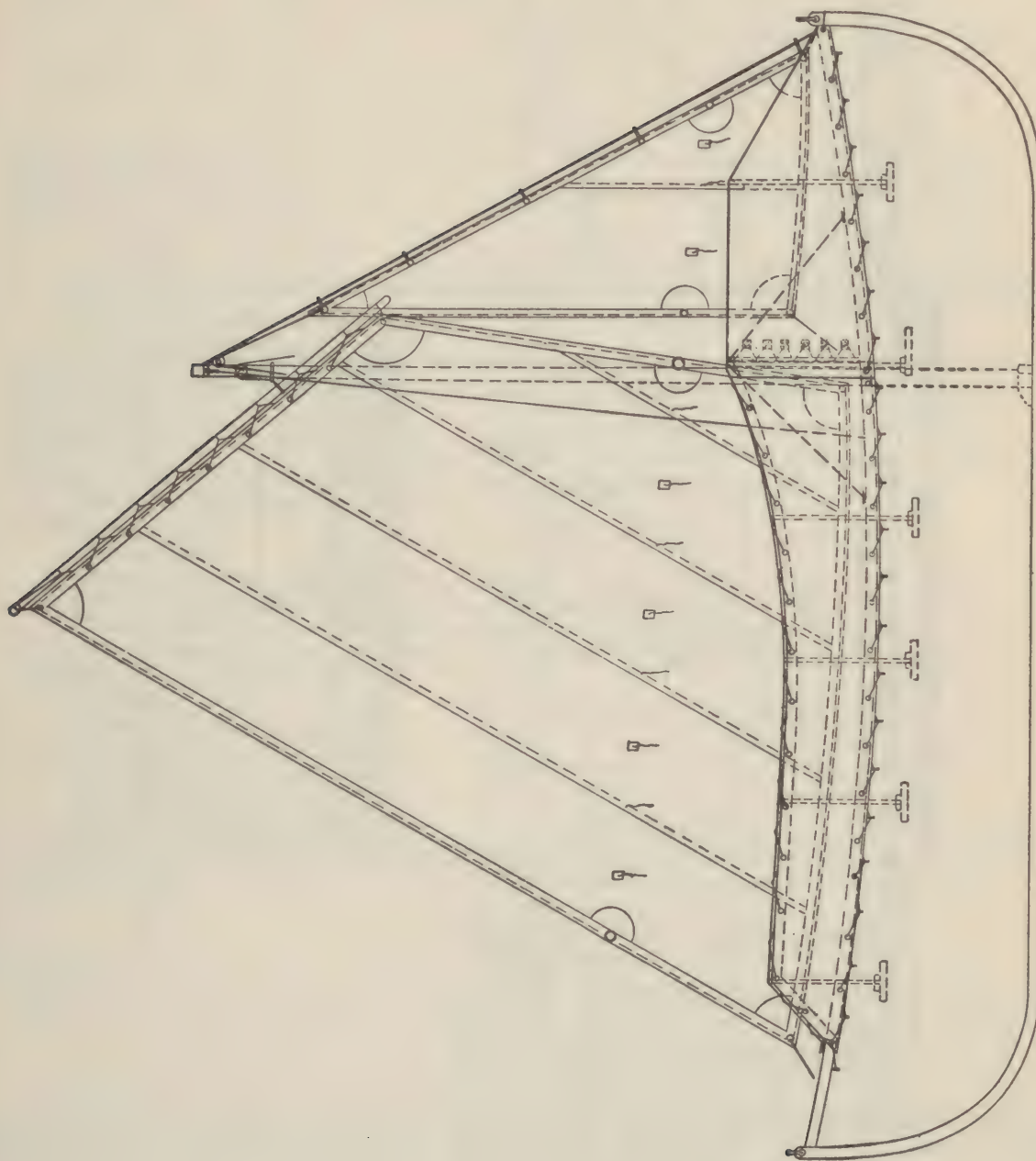


FIGURE 7.—Rig of sail and jib.



**SAILS AND MASTS—APPROXIMATE DIMENSIONS**

BOAT LENGTH FEET	LUG SAIL			CLEW TO THROAT—FT	JIB SAIL			MAST*				
	AREA, SQ. FEET	LUFF LENGTH, FEET	LEACH LENGTH, FEET		AREA, SQ. FEET	LUFF LENGTH, FEET	LEACH LENGTH, FEET	FOOT LENGTH, FEET	LENGTH, FEET	DIAMETER, INCHES		
15—16	58	5½	11½	8	7	10	15	8	6½	4½	10	2¾
16—18	72	6½	13	9	7½	11½	18½	9½	7½	5	11	3
18—20	91	7¼	14½	10	8½	13	24	10	8	6	12½	3¼
20—22	112	8½	16½	11½	9	14½	27	11	9	6	14	3½
22—24	138	9½	17	13	9½	16½	28	12	9½	6	15	3¾
24—26	145	7	19⅔	14¼	11¼	16½	30	13	10½	6	16	4
26—28	165	7¾	20½	15¼	11¾	17½	34	15	12	6½	18	4¼
28—30	198	8¾	22¼	16	13	19	38	15	12	7¼	19	4½
30 OR OVER					PROPORTIONALLY LARGER							

\* MAST LENGTHS MEASURED FROM HEEI TO CENTER OF UPPER HALLYARD SHEAVE  
MAST DIAMETERS MEASURED AT THWART

**SAILS—APPROXIMATE MATERIAL STANDARDS**

BOAT LENGTH FEET	CANVAS OZ. PER SQ. YD.	COMMERCIAL DESIGNATION
24 OR LESS	14.35	NO. 10
24 TO 30	17.5	NO. 8
30 OR ABOVE	20.74	NO. 6

ALL SAILS SHALL BE OF GOOD QUALITY CANVAS, UNBLEACHED  
CHROME YELLOW OR RED IN COLOR.

Figure 7A.—Approximate dimensions and material standards for sails and masts.

## OARS

**Oars.**—A single banked complement of oars, two spare oars, and a steering oar with rowlock or becket conforming to the following requirements:

*Minimum number and length of oars*

Length of boat	Number of oars	Spare oars	Total, including steering oar	Rowing oars	Steering oars
				<i>Feet</i>	<i>Feet</i>
16 feet and under 18 feet.....	4	2	7	10	12
18 feet and under 20 feet.....	4	2	7	11	13
20 feet and under 24 feet.....	4	2	7	13	14
24 feet and under 28 feet.....	6	2	9	14	15
28 feet and over.....	6	2	9	15	16

**Motor lifeboats and lifeboats fitted with propellers operated by hand shall be equipped with four oars and one steering oar. (46 C. F. R. 59.11.)**

**Steering oar distinguished.**—The steering oar should be painted with a distinctive color, or otherwise suitably marked so as to be easily recognized, in order to prevent confusion when the oars are to be shipped.

**Wood for oars.**—Oars should be straight-grained, free from all defects which would affect their serviceability, and of the following woods, preferably of ash:

Ash—white, green, blue, or Baltimore.

*Hardwoods:*

Elm, American.

Hickory, pecan—bitternut, nutmeg, water, or pecan.

Hickory, true—shellbark, mockernut, pignut, or shagbark.

Oak, commercial red—black, laurel, pin, red, scarlet, southern red, swamp red, water, or willow.

Oak, commercial white—burr, chestnut, post, swamp chestnut, swamp white, or white.

*Softwoods:*

Baldycress.

Cedar, Port Orford white.

Douglas fir.

Pine, long leaf.

Pine, short leaf.

Pine, red (Norway).

**Weight of oars.**—Oars should be of the approximate minimum weights as provided in the following table:

Oars			
Length, feet:	Approximate weight, pounds	Length, feet:	Approximate weight, pounds
10.....	7	13.....	11¾
11.....	9	14.....	13¾
12.....	10½	16.....	18½

## PAINTERS

**Painters.**—One painter of Manila rope not less than 2¾ inches in circumference and a length not less than three times the distance between the boat deck and the light draft secured in the forward part of the boat with a strop eye and toggle so that it may be rigged as a sea painter and readily released from the boat.

One additional painter, 15 fathoms of 2¾-inch manila, shall be secured to the stem and coiled in the boat ready for use. (46 C. F. R. 59.11, 153.6.)

**Use of sea painters.**—It is apparent from the examination of the testimony of survivors that only after experience in casualties have masters and officers found that the use of the sea painters



can cause serious accidents unless their function is properly understood. Pilot vessels, cable vessels, wrecking vessels, and other ships engaged in work necessitating the use of small boats in the open sea have evolved a system of launching boats while the vessel still has way upon her by using a line known as a "sea painter" made fast at about the center of the forward thwart of the boat. The pull exerted being upward and aft of the stem, the boat upon being waterborne and coming back on the painter will take an immediate sheer away from the side of the moving vessel. This operation can be aided by the use of a steering oar or rudder. These evolutions can be readily accomplished by a trained boat's crew with the ship going ahead at 3 to 8 knots, depending upon the state of the sea. It should be borne in mind that practice and familiarity with the characteristics of the boat and long experience in the use of the sea painter in quickly getting away from the side of a vessel *under peacetime conditions cannot be compared with the circumstances surrounding the abandonment of a vessel sinking from enemy action.*

**Rig of painter under wartime conditions.**—Under peacetime conditions the boat's crew and the ship's officers can maneuver the ship, watch the sea, and await the most favorable opportunity for placing the boat on the water. The ship has no list nor is there the unavoidable confusion and noise attendant with the sinking and shifting of a vessel which has been torpedoed and is perhaps being shelled. It is desired, therefore, to point out that in order to prevent the sea painter from causing the boat to sheer and yaw after it is on the water and the survivors are coming down the lifesaving net, over life lines, or down the falls into the boat, certain precautions are necessary. Unless some means are provided to direct the pull exerted on the sea painter by the vessel's ahead motion to a point *far enough forward* in the lifeboat to decrease the tendency to sheer, serious accidents will occur. This is particularly true when the vessel is listed and the sea is moderately rough or choppy. To retain better control of the boat many masters and mates have fitted a strop of manila near the stem which can be passed over the sea painter and the free end passed under a thwart. Between the time the boat hits the water and the instant that all are on board and it is decided to cast off, the strop being pulled taut will more properly tow the boat parallel with the vessel's side. When the officer in charge is ready to pull away, the strop can be quickly released, the end thrown free, the boat then sheering away when the strain comes directly on a sea painter at the point where it is fast to the forward thwart. This tendency to sheer can and should, of course, be regulated by the use of the rudder or steering oar. These precautions should be carefully explained to all officers and men and they should be drilled in its use. Unless this is done, a repetition of serious accidents to boats (*after they are apparently safe over the side*), with a consequent loss of life, may be expected. See figure 8, "Sea painter attachment."

**Fetching abreast lifesaving net.**—The sea painter should be made fast at a point in its length with due regard to the vessel's draft on each particular voyage so that when the boat is in the water and the sea painter is taking the strain, the boat fetches up abreast a lifesaving net.

**Rigging—Releasing.**—Painters should be made fast at the ship's rail in such manner that they may be readily released from that position even if under severe strain. Crews should be thoroughly instructed in the use and purpose of the sea painter and also of the importance of not unhooking the forward fall if releasing gear is not fitted until the sea painter takes some strain. It should also be pointed out to the men that the operation of releasing gear before some strain is on the painter may bring the boat up with a severe jerk, knocking all hands off their feet and otherwise creating confusion. Crews should be shown the method and operation of the strop and toggle and cautioned against releasing the boat if release will allow the boat to drift back under the quarter and perhaps under the propeller, which may still be turning over.

**Securing toggle pin.**—The wooden toggle pin should be attached to the boat by a light line and not to the eye of the painter, as when it is pulled it may strike someone in the boat as the painter snaps off the thwart.

**Additional painter.**—The additional painter secured to the stem should be neatly coiled clear of the sea painter and available for use after clearing the ship's side.

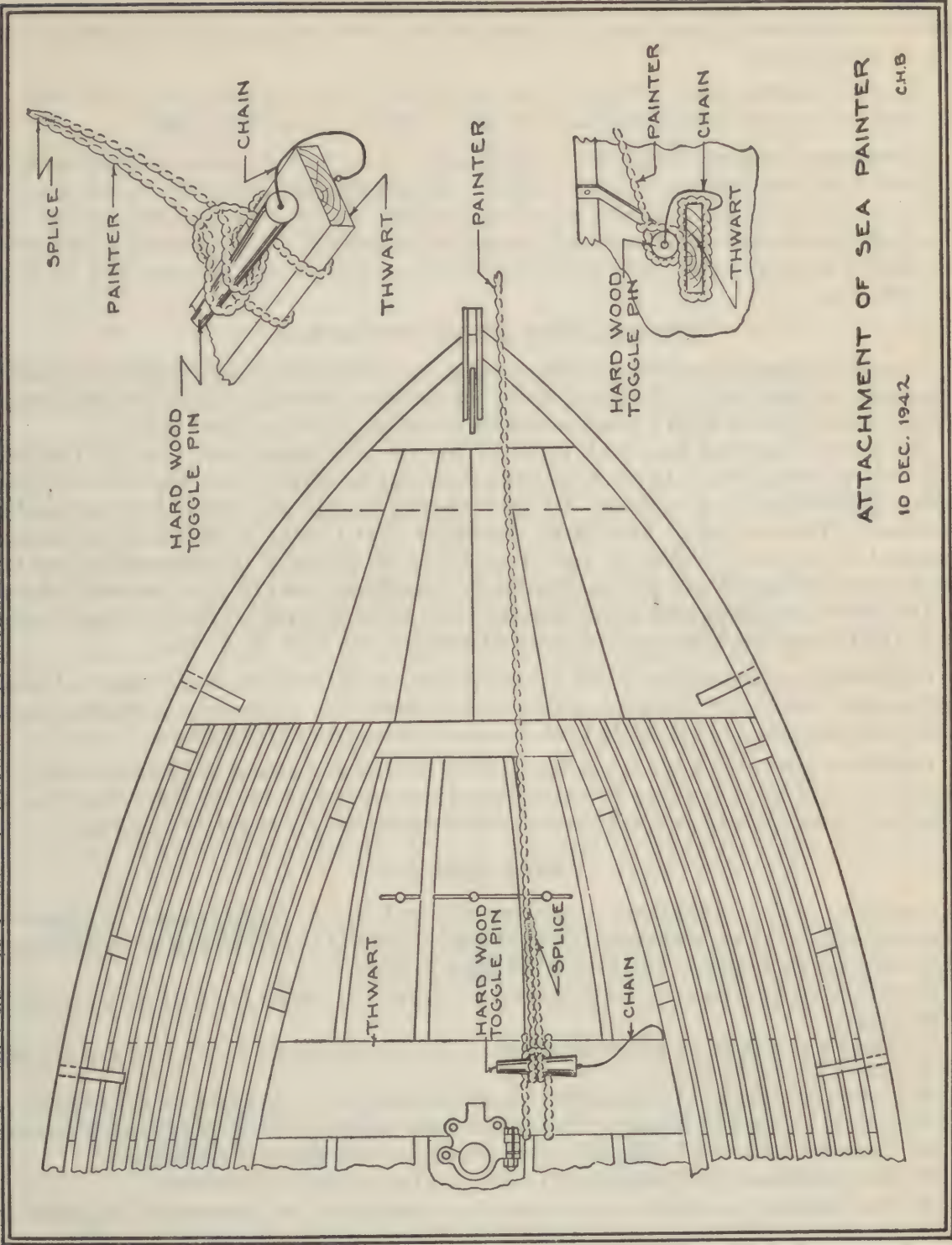


FIGURE 8.—Attachment of sea painter in lifeboat.



## PLUGS

**Plugs.**—Each metallic lifeboat shall be fitted with an automatic plug. Drain holes, fitted with automatic plugs, shall be provided with two caps attached by chains. (46 C. F. R. 59.11, 59.15.)

**Plugs for wooden boats.**—Wooden lifeboats not fitted with automatic drain holes must be equipped with two plugs for each drain hole securely attached to the boat with chains.

**Arrangement—Inspection.**—Drain holes should be fitted in such manner as to allow water to completely drain from the boat; i. e., with no ridge or coaming around the hole which allows water to stand there. They should be located in such position that the boat will completely drain. The rubber balls fitted to automatic plugs should be examined periodically for deterioration. The threads on automatic drains and caps should be free from paint and corrosion and the caps tried for fit at each inspection.

## PROPELLERS (HAND-OPERATED)

**Propellers (hand-operated).**—Lifeboats may be fitted with a hand-operated propeller of an approved type, but all lifeboats, except motorboats, having a capacity of 60 or more persons, shall be fitted with a hand-operated propeller of an approved type.

The hand-propelling gear shall be substantially constructed and fitted in the boat in an efficient manner and be such that the boat may be readily maneuvered away from the ship's side after being launched and steerageway maintained, under adverse weather conditions. The gear shall be of such character that it may be operated by persons untrained in its use. It shall be such that it can be operated satisfactorily when the boat is partially flooded and will be effective in propelling a boat fully or partially loaded.

The above propelling gear shall be required in all such lifeboats fitted on new vessels and to the lifeboat replacements on existing vessels. (46 C. F. R. 59.11.)

**Lubrication—Care.**—Care should be taken that the oil provided in gear boxes of hand-propelling gear is sufficiently fluid in cold weather to assure ease of operation. Propeller shafts, stuffing boxes, etc., should be given the same care as are similar items in motorboats.

**Periodical tests.**—The hand-propelling gear of each lifeboat should be operated ahead and astern for a period of not less than 5 minutes at least once in every 7 days to test its readiness for service, such operation to be part of the lifeboat drill and included in the report of such drill.

## PROVISIONS

**Provisions.**—The provisions, consisting of hard bread or equivalent of approved emergency ration, shall be removed from the lifeboats and the following provisions shall be provided for each person the boat is certified to carry:

(1) Fourteen ounces of biscuits known as "Type C" ration covered by U. S. army specifications.

(2) Fourteen ounces of pemmican covered by specifications for U. S. Navy aircraft emergency ration pemmican.

(3) Fourteen ounces of chocolate tablets in waterproof packages or containers, or an additional 14 ounces of biscuits "Type C" rations covered by U. S. Army specifications.

(4) Fourteen ounces of milk tablets in waterproof packages or containers.

(5) The provisions shall be stowed in airtight receptacles as heretofore.

(6) Equivalents in calorific value may be substituted for pemmican required by item (2) and the milk tablets required by item (4) or both, provided that the substitutes and packing are satisfactory for lifeboat use. Samples of proposed substitutes shall be submitted to the Commandant for approval.

(7) All lifeboats on all mechanically propelled cargo and tank vessels which are certificated for the first time after January 1, 1943, shall be provided with provisions as required by these regulations for the number of persons which the boat will accommodate on the basis of ten cubic feet per person. (46 C. F. R. 153.6, 153.3.)

**Packing.**—The packing of provisions in lifeboat bread boxes should be carried out in a careful manner. Packing all of one type of ration followed by the total quantity of the next type precludes any possibility of rationing out a little of each daily without unpacking the whole box. Rectangular packages which are waterproof in character are desirable in that they stow more compactly.

**Malted milk tablets—Packing.**—Malted milk tablets should, in order to be suitable for use as lifeboat rations, conform to Federal Specification C-M-341 for dry malted milk and should be of the unflavored enriched type. Inasmuch as malted milk tablets readily absorb moisture from the air, they should preferably be packed in containers which may be resealed airtight after opening. Rectangular metal containers with a suitable resealed top or smaller packages wrapped in metal foil are satisfactory. Packages of malted milk tablets should be marked with the name and location of the packer, and weight of the contents.

**Type "C" biscuits.**—Type "C" biscuits are to conform in all respects with the U. S. Army Quartermaster Corps specifications currently in force, the last issue being of 20 March 1942, for the biscuit portion of unit "B" U. S. Army field ration "C" with the exception of size and packaging. Biscuits shall be cut in rectangular or square form. Copies of this specification may be obtained from the Office of the Quartermaster General in Washington or from the local quartermaster depot. In this connection, biscuits may be either of a size approximating  $2\frac{1}{8}$  by  $2\frac{1}{8}$  by  $\frac{5}{16}$  inches or  $2\frac{1}{4}$  by  $1\frac{1}{8}$  by  $\frac{1}{4}$  inches. Both biscuits count approximately 28 to 30 to the pound.

**Type "C" biscuits—Packing.**—The packaging of biscuits to be satisfactory should in general conform to the following: An individual ration of 14 ounces is to be packed in rectangular pasteboard cracker boxes in inner wrapping of cellophane or wax glassine paper provided to separate the biscuits from the pasteboard. An outer wrapping of heavy wax glassine, moisture- and grease-resisting paper, heat-sealed, or equivalent waterproof wrapping is to be provided. Each package is to be marked with the name and location of the packer and the weight of the contents. Where inspectors are of the opinion that biscuits found in lifeboats are of questionable quality, they shall be replaced and samples of old biscuits shall be delivered to Headquarters for analysis.

**Pemmican—Packing.**—Pemmican, as presently manufactured, is packed in round  $3\frac{3}{4}$ -ounce cans with a rip seal opening. An improvement in this packaging is now being worked out and it is believed that shortly 14-ounce cans with a similar type opening will be available. These cans will be rectangular and will be marked with the name and location of the manufacturer and the weight of the contents.

**Rations—Calculations.**—In utilizing lifeboat rations, it should be borne in mind that there are 56 ounces of food for each man, totaling approximately 8,000 calories. This 56 ounces may be rationed out at the rate of approximately one-tenth the total amount or 5.6 ounces per day, giving a daily diet of approximately 800 calories, which is sufficient to sustain life. At this rate, the ration will last 10 days. Each biscuit weighs approximately one-half ounce. Nineteen malted milk tablets weigh approximately 1 ounce. One-fourth can of pemmican, as presently packed in  $3\frac{3}{4}$ -ounce cans, is slightly less than 1 ounce. Thus amounts to be rationed daily can be calculated and determined. The foregoing scale is predicated upon a boat loaded to capacity and anticipating rescue within 10 days. The amount of food rationed daily should be governed by the officer in charge, taking into consideration the actual number of persons in the boat and the probable length of time before rescue may be effectuated.

**Eating rations.**—Food should be eaten slowly and chewed thoroughly. Emergency rations will serve their purpose better if taken several times a day in small quantities rather than served at one meal in a larger quantity.



**Care of bread boxes.**—Care should be taken that bread boxes are dry, sweet, and clean before filling. In this connection, they should be sweetened, if necessary, by washing thoroughly with hot water and washing soda, rinsed carefully and dried completely. The inside of bread boxes should not, for good results, be painted. If they have been painted, care should be taken that any loosely adhering paint is removed by brushing.

**Number and stowage of containers.**—Dispersal of stocks of provisions in more than one container is most desirable to preclude loss of all rations by damage or leakage. In the smaller boats no less than two containers, and preferably three, should be provided. Larger boats call for four to six containers. Shape and arrangement should be such as to provide ready and efficient stowage with minimum loss of space. Containers fitted under thwarts should not project beyond the forward or after edge—i. e., maximum fore and aft depth not exceeding width of the thwart. Each container should be plainly marked with the number of rations (complete) which it contains. Rings or eyes should be fitted to facilitate lashing. Containers should be designed to properly fit in with the arrangement and stowage of each type and size of lifeboat. A general plan showing stowage of provision containers and other equipment is shown in figures 16 and 16E.

**Design of containers.**—Provision containers as required by the regulations “shall be of metal and fitted with an opening in the top not less than 5 inches in diameter properly protected by a screw cap made of heavy cast brass with machined threads and an attached double toggle seating to a pliable rubber or felt gasket which will insure a tight joint.”

**Construction of containers.**—Fabrication of provision containers should be such that they will withstand hard usage and maintain absolute watertight integrity. Difficulty has been experienced because containers were fabricated of metal too light in gage; i. e., less than No. 20. Provision containers should be constructed in the same manner and with seams and joints as water or air tanks. The threaded ring provided should be reinforced around the edge and riveted as well as soldered to the tank. Crimped edges should not be provided and all sides of the container should be flush; i. e., no standing edges to catch water which hastens corrosion and rotting of metal or gaskets. No objection should be raised to the substitution of a type of cap which tightens in a manner similar to a gun lock by turning one half turn. It is preferable that the lugs fitted for opening be such that the cap cannot be easily started or unscrewed by hand; i. e., some sort of tool or bar is necessary to turn it. This prevents pilferage and furthermore allows a more secure tightening. The lugs should be substantial in character in order that they may not carry away with hard usage.

**Gaskets.**—Gaskets should be sufficient in width and fit the caps properly. The gasket shelf should not be less than one-half inch in width. Gaskets should be in one piece, substantial, weather-proof and noncorrosive in character.

## ROWLOCKS

**Rowlocks.**—One set and a half of thole pins or rowlocks attached to the lifeboat by separate chains. (46 C. F. R. 59.11.)

**Construction—Fitting.**—Rowlocks should be constructed of suitable material such as bronze or grade A malleable cast iron. Rowlocks of this latter material will not break if hammered sharply. Rowlocks which are not properly malleableized will snap very easily if hammered. The fastening of rowlock sockets or check pieces in wooden gunwales should be adequate. Two short wood screws are obviously not sufficient to hold the socket in place. Rowlocks should be designed with a sufficiently long shank, at least  $1\frac{1}{2}$  times as long as the maximum width of the crutch. Malleable rowlocks should be hot-dipped galvanized and attached by galvanized chain of sufficient length.

**Steering rowlocks.**—The steering rowlock provided should have a long shank and deep crutch and should preferably be fitted with a ring or other suitable means to prevent the steering oar from jumping out of the crutch. Some officers prefer to fit a wire grommet for steering. In any case a properly rigged wire grommet is preferable to a regular rowlock fitted in the steering oar position.

## RUDDER AND TILLER

**Rudder and tiller.**—One rudder and suitable tiller to be fitted to the rudder. (46 C. F. R. 59.11, 153.6.)

**Fitting—Removal of yoke and line.**—By requiring that a tiller be furnished for the rudder of all lifeboats, it is intended to supplant the yoke lines. There are two ways of constructing tillers; i. e., to have the socket in the tiller which slides over the rudder head or to have the socket in the rudder head for the tiller to slide through. In either case, it is important that a pin be provided of a substantial nature which when placed in its hole will stay in position and secure the tiller to the rudder in a substantial fashion so that it may not come loose in a seaway. If the socket is in the rudder head, the best means of construction is to have the tiller enter from the after end of the rudder and pull forward to a tight fit in the final position at which point it will be pinned in place.

**Efficiency.**—This method of construction almost eliminates the possibility of losing the tiller accidentally, as the harder the pull the tighter it fits in the socket. Rudders are best constructed by providing a positive rod and pin attachment, and if not so constructed, means should be provided so that they may not possibly float off or lift off in a seaway. The rudder can be attached to the boat by a lanyard to enable it to be recovered should it float or otherwise come free of the gudgeons.

## SEA ANCHOR

**Sea anchor.**—After 1 January, 1943, all new sea anchors and replacements for existing sea anchors shall be of a circular pattern with a mouth not less than 36 inches in diameter, constructed of no. 2 canvas strongly sewn and roped at the seams and having a length of not less than 5 feet from mouth to tip. The tip shall be arranged for securing therein a conical shape storm oil container of at least 1-gallon capacity.

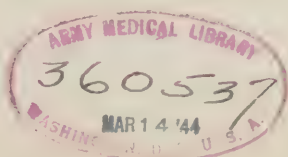
A strong metal hoop, of not less than ½-inch material, rendered noncorrosive by galvanizing or other suitable method, is to be fitted around the mouth and strongly sewn into the canvas. A bridle of not less than 6 lines evenly spaced of 12-thread material shall be attached to the hoop and terminated in a ring or grommet for the attachment of a riding line. (46 C. F. R. 59.11.)

**Sizes.**—Extreme difficulties have been experienced in handling boats in a rough sea because of improper and insufficient sea anchors. Accordingly, it is extremely important that sea anchors be provided of sufficient size.

**Caution.**—When using riding lines care should be taken that chafing will not take place where line passes over gunwale. Where chafing is likely to take place, the riding line should be well wrapped with canvas or other chafing gear.

**Bucket as sea anchor.**—In an emergency a bucket may be used as a sea anchor or drag.

**Oil container.**—It is to be noted that the conical-shape oil container for use with the sea anchor is required to be of at least 1-gallon capacity. To facilitate stowage it may be advantageous to carry the sea anchor and oil container separately. It has been found that, in a number of instances, oil has leaked from the pet cock and soaked into the canvas of the sea anchor, causing rapid deterioration and rot and rendering the sea anchor useless. Care should be taken in the adjustment of the pet cock to prevent an excessive flow of oil. The flow can be controlled by regulating the opening on the top pet cock. The oil container should be of rugged construction, and the pet cocks securely soldered so that they may not be easily broken off or damaged, and stowed in such a place that it is least likely to be damaged by the occupants of the boat.





## SIGNAL FLAG

**Signal flag.**—One yellow or bright orange bunting flag (4'6" x 8') to be attached to a boathook pole, for tricing up to masthead to attract aircraft. (46 C. F. R. 153.6.)

**Color, use.**—It has been found that orange-colored objects are more visible on the water than any other color. The inclusion of a signal flag has been found necessary in order to provide an object of high visibility that may be displayed when friendly aircraft are sighted in order that the airmen may be able to see the lifeboat. Triced up to the mast it also serves a similar purpose for lookouts on passing vessels. In displaying the flag to be observed by airmen, the best method is for two men to hold each end of the flag and stretch it out taut and then move the short axis from a vertical to a horizontal position in order to give a flash of color which may attract the observer's eye.

**Ties for bending.**—Signal flags should be provided with ties in order that they may be properly attached to a boathook or staff. A horizontal sprit or yard of light material can be contrived by survivors in a boat and the flag hoisted to the top of the mast and held in a horizontal position by tricing lines from the free corners.

**Material.**—There is available a fluorescent cloth which is now utilized by military services for signaling in panels to aircraft. This material has been found to be more visible at 10,000 feet than any other. It would make an excellent signal flag. It is manufactured in two colors known as "arc yellow" and "neon red."

## SIGNALING MIRRORS

**Signaling mirrors.**—Two stainless steel or other suitably polished metal mirrors having at least 20 square inches of reflecting surface on each side. The mirrors shall be heavily coated with a neutral preservative grease and wrapped in a waterproof container plainly marked "signaling mirrors." (46 C. F. R. 153.6.)

**Desirability of light reflectors.**—Pocket mirrors, bright pieces of tin, flattened tin cans on the blade of an oar, or other shiny devices have been responsible for rescuing persons adrift on rafts or boats during the present war. Flashes from such articles can be readily seen by observers and pilots in airplanes and by men on the bridge of surface vessels.

**Distance effective.**—It is not possible to lay down definite limits of effective distance from flasher to observer. In relatively clear atmosphere, 10 miles. Under hazy conditions, up to the approximate distance from which outline may be discerned.

**Visibility of flash.**—Obviously, the observer can best see the flash when he is directly in line between the sun and the flasher. (Call this "zero degrees.") Conversely, the observer cannot see the flash at all if the position of the flasher is directly in line between himself and the sun. (Call this "180 degrees.") Flashes can be effectively seen from 0 degrees up to about 135 degrees or about three-quarters of the total arc; that is, in most of the angles which an airplane observer will be to the flasher.

**Sighting instructions.**—In order to most effectively utilize the signaling mirror, all seamen should familiarize themselves thoroughly with the sighting instructions and technique shown in figure 9. Unless this method of aiming the mirror is used, the chances of the flash being seen by the observer in an airplane or surface vessel are extremely remote.

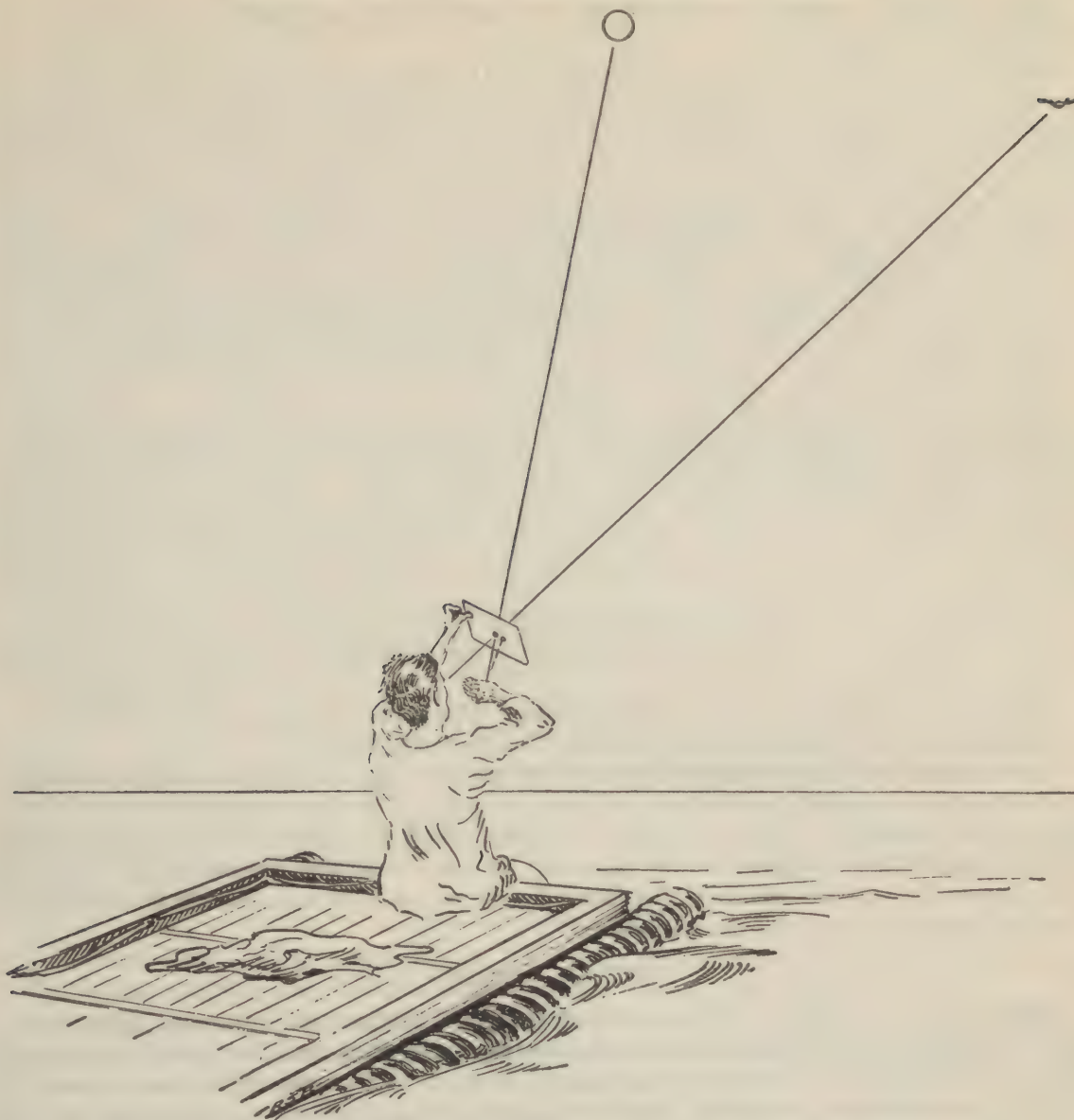


FIGURE 9.—Sighting a signaling mirror.

**To Use Signaling Mirror:**

1. Observer should face a point about half way between the sun and the observed object.
2. Hold the mirror in one hand about 4 inches from the face and sight the object to be signaled through the hole in the mirror.
3. Hold the other hand about 12 inches behind the mirror in line with the sun and the hole through the mirror, so that a small spot of light appears on the hand. The small spot of light on the hand is reflected on the back face of the mirror (side toward the observer).
4. Now tilt the mirror so that the spot of light on the back face of the mirror disappears through the hole in the mirror, at the same time keeping the observed object sighted through the hole in the mirror. With the mirror in this position the light rays from the sun will be reflected to the observed object.

NOTE: When the angle between the sun and the observed object is small the spot of light will appear on the face of the observer, thus allowing both hands to be used in tilting the mirror.



**Construction.**—Metal signaling mirrors to be suitable for use should conform closely with the following description:

Mirror should be of not less than 0.031 inch thick chromium-plated steel sheet; size should be about  $5\frac{1}{2} \pm \frac{1}{2}$  inch by  $7\frac{1}{4} \pm \frac{1}{2}$  inch; corners rounded, with radius  $\frac{3}{8}$  to  $\frac{1}{2}$  inch; a  $\frac{3}{16}$ -inch hole should be located in the center for sighting and in one corner for lanyard attachment. Edges, including holes, should be free from burrs, and plated or lacquered to prevent corrosion. The steel should be polished to a high finish, free from waves and pits or holes that would produce a distorted image. The steel should be thoroughly electrolytically cleaned and copper plated to a thickness of 0.00035 inch, over which should be plated 0.0004-inch nickel with no visible pits or burned or treed edges. The nickel should be buffed, cathodically cleaned, rinsed, acid dipped, and chromium plated to a thickness of not less than 0.00001 inch. The chromium-plating procedure should be so regulated that no buffing is necessary on the chromium finish, which should be free from water spots or surface films, and should show no peeled or unplated surface areas or racking marks. The thickness of coating should be checked by magnetic readings or the microscope method. The chromium thickness should be determined by the drop, or loss-of-weight, method. Adherence of plating should be tested by bending the mirror flat back upon itself. There should be no peeling, lifting, or chipping of plating due to this bend.

Mirrors should have a reflectivity of not less than 62 percent and should show no appreciable corrosion at the end of a 48-hour salt-spray test made in accordance with the A. S. T. M. specification for type KS coating.

Mirrors should be coated with cosmoline or other neutral grease and wrapped two each in a waterproof container. Container should keep contents dry after 10 days submersion in a 3-percent salt solution by weight.

Instructions for sighting mirrors printed in large type on heavy paper should be enclosed in each container which should be plainly marked "Two Signaling Mirrors."

It is expected that other types of mirrors suitable for use under the regulation will be developed. It should be borne in mind that a mirror, to be suitable, should be of good quality and have a high percentage of reflectivity. Due to the high priorities needed for stainless steel, signaling mirrors will not, in general, be constructed of this material. It has further been shown that for marine use nickel chrome has superior qualities. Undoubtedly mirrors of other material will be developed in a form acceptable for use under the regulations.

## SIGNAL PISTOL

**Signal pistol.**—There is to be provided for each lifeboat an approved signal pistol outfit consisting of an approved pistol with lanyard attached and 12 approved parachute signal cartridges, both contained in an approved portable watertight metal case, the cartridge to contain a projectile which will give forth a brilliant red flame of not less than 20,000 candlepower and capable of being projected vertically to a height of not less than 150 feet and of not less than 30 seconds' burning duration.

The signal pistol outfit shall be constructed in accordance with the following specifications:

(Pars. 1 to 8, inclusive, of these specifications are omitted. They may be found in 46 C. F. R. 59.11(f).)

(9) The use of signal pistol cartridges shall not be permitted for a period of longer than 4 years from the date of manufacture.

(10) The portable watertight case shall be constructed of copper or other noncorrosive metal or steel which has been thoroughly galvanized, of not less than No. 19 B. W. G. thickness, seams lock-jointed and soldered. The cover shall fit on a tight rubber gasket and be securely held in place by clamps or dogs. The case should be of a size that will conveniently contain the pistol and 12 cartridges. (46 C. F. R. 59.11, 153.6.)

**Parachute flares—Daytime use.**—Should friendly air or surface craft appear during the daytime it may be desirable to fire a parachute flare from the signal pistol as the smoke emitted in burning or the high candle powered light may be sufficient to attract the pilot's attention.

**Inspection—Care—Replacements.**—The signal pistol should be taken out of the container and cleaned and oiled periodically. Signal pistol cartridges which are corroded or otherwise questionable in appearance should be tested, and if there is any doubt as to their efficiency, they should be rejected and replaced by a fresh lot. In any case, cartridges more than 4 years old must be replaced. A light painting of wax over the sealed end of the cartridge will help preserve it and preclude the entrance of moisture. The cartridge cases themselves can be rubbed with a light film of pure vaseline in order to protect them from corrosion.

**Removal of unapproved pistols and cartridges.**—Equipment other than that approved and listed herein should be removed from lifeboats.

### STORM OIL

**Storm oil.**—One container holding 1 gallon of vegetable or animal oil, so constructed that the oil can be easily distributed on the water and so arranged that it can be attached to the sea anchor. (46 C. F. R. 59.11.)

**Container construction.**—A sheet-metal storm oil container constructed in conical fashion of suitable size to fit inside the tip of the sea anchor is one of the better types utilized. The container is fitted with a valve or cock which can be cracked to allow a slow seepage of oil. Lashing rings are provided to secure the container inside the canvas tip of the sea anchor. Storm oil containers should be so constructed that they will not easily be cracked or broken.

**Suitable oils.**—While thick and heavy vegetable oils are, under warm-weather conditions, the best for use as storm oil, they congeal in cold weather and are thereby rendered useless. Such oils as coconut, fish, and whale oil are best utilized with some thinning agent for general all-around use. It appears from available information that oil of turpentine is most suitable for use as storm oil. It spreads easily and is efficient in its tendency to reduce the forming of the waves by the wind, and in preventing breaking of seas. Petroleum and mineral oils, such as fuel or lubricating oils, are not suitable.

### BULLET-HOLE PLUGS

**Wooden plugs.**—Not less than 25 softwood plugs 3 inches long, tapered from  $\frac{1}{4}$  to  $\frac{3}{4}$  inch in diameter and contained in a canvas bag. (46 C. F. R. 153.6.)

**Canvas bag—Rags.**—Canvas bag should be plainly marked with indelible print "Wooden bullet-hole plugs." It should be properly secured to prevent its floating out of the boat in the event the boat is flooded. Two or three pounds of rags should be placed in the locker or other suitable place for use in connection with plugs.

**Supplementary repair equipment.**—As recommended in previous instructions to masters, the wooden plugs provided by the above regulations could well be supplemented by 24  $\frac{1}{4}$  by 2 inch long toggle bolts and accessory washers; 24 stove bolts and nuts; 3 balls of candlewicking; 2 pounds of white lead in oil; 3 pieces of sheet lead one-sixteenth inch thick, 8 inches long by 4 inches wide; and 3 square feet of waterproof adhesive tape.

**Substitutes.**—The last three items—i. e., white lead and oil, sheet lead, and waterproof adhesive tape—can be dispensed with and should in the interest of wartime economy be omitted. There should be substituted therefor a superior adhesive as a filler or plastic which, while it cannot be utilized for plugging large holes without some supporting sheeting or canvas, is very tenacious even under extremes of heat or cold, wet or dry, and certainly would be found most useful. As a substitute for the three pieces of sheet lead totaling about 100 square inches, a piece of 18- or 20-gage sheet metal can be utilized. Waterproof adhesive tape is desirable if it can be obtained.



## MOTOR LIFEBOAT

### VESSELS ON WHICH REQUIRED

**Motor lifeboats.**—On all ships of 3,000 gross tons and over which are certificated for the first time after January 1, 1943, one of the lifeboats on each side shall be motor-propelled.

**Equipment.**—In addition to being provided with all equipment required for lifeboats, such motor lifeboats shall carry at least two 1-quart size fire extinguishers of the carbon tetrachloride type. Motor lifeboats carried on passenger vessels in compliance with Section 59.5 of the General Rules and Regulations (Passenger Vessels) shall in all cases be fitted with a radio installation and a searchlight in accordance with Section 59.11a of said regulations.

**Motor and accessories.**—The engine for motor-propelled lifeboats shall be of a reliable type, permanently installed inside the lifeboat.

The power of motor lifeboats shall be such that the speed through the water, in smooth water, shall be at least 6 knots when fully loaded. Under these conditions, fuel capacity sufficient for 24 hours' continuous operation shall be provided.

Suitable provision shall be made for going astern.

The motor shall be protected by a weatherproof enclosure. The top of the enclosure shall be constructed so that it may be removed when necessary and shall be fitted with a ventilator of a water-protector type.

Fittings, pipes, and connections shall be of high standard and good workmanship and installed in accordance with good practice. There shall be a strainer between carburetor and fuel tank and an efficient hand starter. (46 C. F. R. 153.3.)

**Advantages of motor lifeboats.**—Motor lifeboats may be used with advantageous results such as quickly getting away from the side of a rapidly sinking vessel, or when the vessel and adjacent water is on fire, performing rescue work at sea, tending and towing nonpropelled lifeboats, rafts, or floats, etc.

**Construction.**—Motor lifeboats, whether required to be carried by regulation or not, should be constructed in all respects in accordance with the "Recommended Practices for the Care and Safe Operation of Motorboats" as contained in the Motorboat Regulations of the U. S. Coast Guard, published under authority of the act of April 25, 1940, with particular reference to backfire flame arresters, venting of fuel tanks and fuel tank compartments, as well as ventilation provided for the engine compartment.

**Fuel—Motor testing.**—Fuel used in motor lifeboats should be high-test white gasoline; i. e., with no ethyl antiknock compound added. Due to chemical changes over a period of time, ethyl gasoline clogs motorboat fuel tanks and lines in such manner as to make starting the motor difficult. When motorboat motors are started with boat in chocks on deck, they should, if run for any but a very short period, be provided with some means of cooling by attaching hoses to the intake and discharge of the cooling system to supply water.

**Mast and sail.**—In all cases motor lifeboats should be fitted with a suitable mast and sail with all accessory equipment as may become necessary to sail the boat to port after it has performed its function and run out of fuel.

## LIFE RAFT ACCOMMODATIONS

### PASSENGER VESSELS

*Passenger vessels.*—Passenger vessels shall be equipped with a sufficient number of approved life rafts to accommodate at least 25 percent of all persons on board in addition to the lifeboats and buoyant apparatus required by the general rules and regulations. Rafts shall be of not less than 15-person capacity each (46 C. F. R. 153.2).

### CARGO VESSELS AND TANK SHIPS

*Cargo vessels and tank ships.*—Cargo vessels and tank ships shall, in addition to the lifeboatage required, be equipped with sufficient approved life rafts to accommodate all persons on board. Rafts shall not have a greater capacity than 20 persons nor less capacity than 15 persons. The minimum number of rafts to be furnished such vessels certificated for routes exceeding 200 miles off shore shall be 4 (46 C. F. R. 153.2).

### TOWING VESSELS, MANNED BARGES, AND MISCELLANEOUS CRAFT

*Towing vessels, manned barges, and miscellaneous craft.*—Towing vessels, manned barges, and miscellaneous craft shall, in addition to the lifeboatage required, be equipped with sufficient approved rafts to accommodate all persons on board: *Provided*, That where lack of space or operating conditions prevent the proper stowage of life rafts, approved life floats may be substituted. Rafts shall not have a greater capacity than 15 persons nor a less capacity than 5 persons (46 C. F. R. 153.2).

*Stowage.*—Life rafts or life floats should in all cases be stowed so that they will float free and be provided with all equipment required by these regulations.



## LIFE RAFTS

### STOWAGE—QUICK RELEASE

**Stowage.**—Life rafts shall be stowed on skids, launching ways, or other alternative means to provide quick release of the rafts directly into the water, and arranged so that they would have the best chance of floating free of the ship if there is no time to launch them. (46 C. F. R. 153.4.)

**Launching arrangements.**—The use of the vessel's rigging without proper support, particularly with the heavier rafts, is to be discouraged. Too much attention cannot be given to providing suitable skids and braces which may be portable, if necessary, in order that they may be unbolted or taken down in port to allow the free swinging of drafts of cargo. In designing and setting up launching ways or skids the angle of the raft in the stowed position should approximate 60° from the horizontal. In several cases rafts have been stowed at an angle so flat that the listing of the vessel after being struck by a torpedo prevented the successful launching of the raft. The skid ways should be constructed at least 9 to 12 inches wider than the raft itself in order to prevent the raft from being jammed by any twisting or wracking caused by a torpedo explosion.

A suggested method of life-raft stowage and the construction of skids are shown in figures 10 and 10A.

#### SUGGESTED ARRANGEMENT FOR LIFE-RAFT STOWAGE SO RAFT WILL FLOAT FREE FROM VESSEL IF NOT RELEASED

1. The inboard support for the raft skid may be located farther outboard to provide additional space for the stowage of deck cargo. The pelican hook turnbuckle pad may also be located farther outboard if desired.

2. It is recommended that the bearing surface of the life rafts on the skid be a minimum of 4 inches on each side, and have a clearance of at least 4 inches between raft and vertical sides of skid to prevent the raft from fouling in the event the skid is distorted.

3. At the discretion of the master, life rafts should be lashed during rough weather at sea to prevent loss. A hatchet or axe should be kept adjacent to each raft so that the lashings can be cut, if necessary. Wire lashing should not be used. While in port, life rafts should be secured to prevent accidental launching.

4. A chain or wire between the pelican hook and the tripping lever is recommended. The use of manila, hemp, or sisal for this purpose is not recommended, as that type of material has a tendency to stretch in dry weather, or under tension, which would cause the raft to move down sufficiently to allow the retainer clips at upper end of raft to disengage. Retainer clips at upper end of raft should be kept engaged at all times by setting up on the turnbuckle when necessary.

5. Painters for life rafts should be kept ready for use at all times while at sea. Painters should not be made fast to the ship by taking turns around cleats, bitts, or other objects. The ends of painters should be secured with a breakable lashing where they will be readily available when launching the rafts, and arranged so that they will not draw the raft under in the event the ship sinks before the rafts are launched. Due to the risk of fouling, painters run through a block at the crosstree and led down to the mast table for use as a gantline while at sea will not be allowed.

**Skids—Friction reduction.**—Skids should be so arranged that the weight of the raft, if exerted on the side of the skid should the vessel stand almost on end, will not be such as to preclude its sliding over the side or floating free. It has been suggested in this connection that rollers

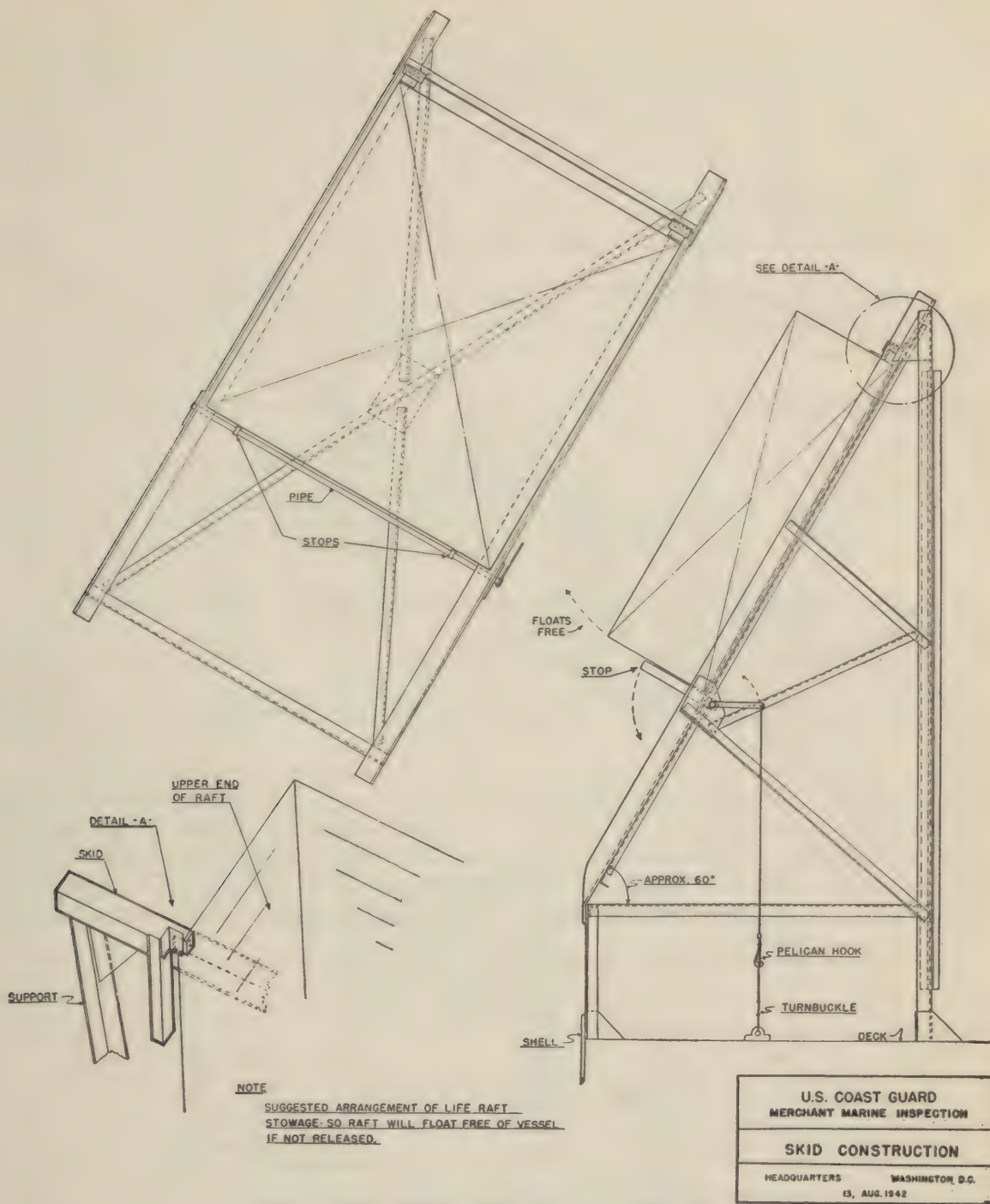
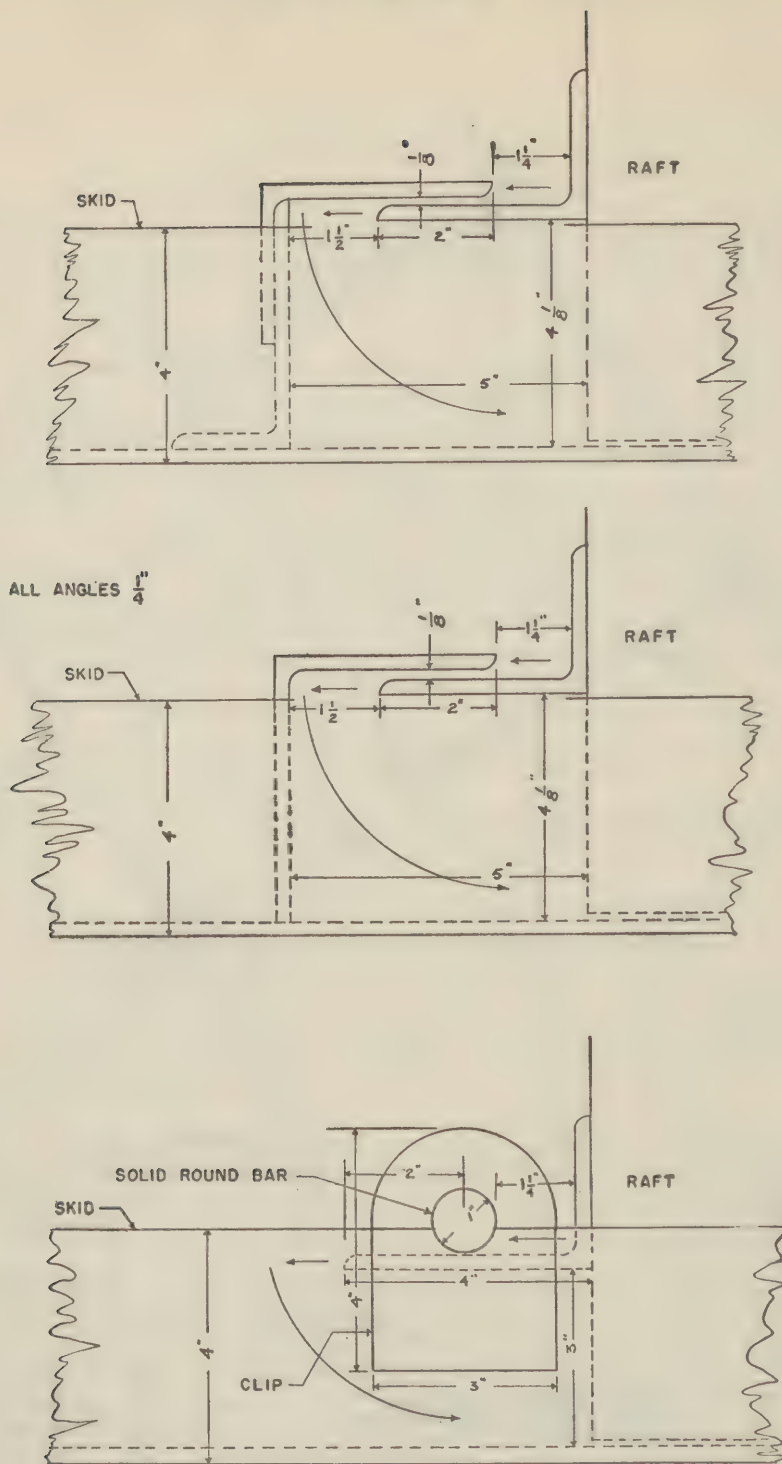


FIGURE 10.—Arrangement for life raft stowage.





THREE METHODS OF HOLDING UPPER END OF RAFT  
TO SKID

FIGURE 10A.—Details of arrangement for life raft stowage.

provided either in the vertical portion of the skid should be provided or that rafts may have half-round iron strips facing the vertical edge of the skids. All this in order to reduce friction and preclude any possibility of the raft sticking to the skids with the vessel in any position. The bearing surfaces of the skids should in any case be well slushed with grease. Fuel oil is useless for this purpose.

**Pelican hook.**—In figures 11 and 12 there is shown a type of pelican hook which is suitable for quick release arrangement by pulling a light line rigged to the bridge or to the after end of the boat deck. This type hook is actually in service and has been found safe and suitable. It may be manufactured by anyone, as Mr. Simonds, the inventor, is desirous of giving it to the country without exercising any patent rights which he might obtain. Releasing arrangements which necessitate a man actually going to a point directly under the raft and releasing a pelican hook or cutting a line have been found unsuitable for wartime conditions. Releasing arrangements should be simple and foolproof.

**Release from two points.**—On vessels having long well decks forward and aft and any vessel where the distance from the accommodation to the raft release is such as to indicate the desirability of releasing the raft from another point, the rig shown in figure 13 may be utilized. This arrangement is particularly desirable on tank vessels.

**Painter—Not to be secured.**—Some vessels are being fitted with painters attached to the bridle of the raft and then run up through a gantling block at the crosstrees and down to a tub. This arrangement serves no useful purpose and it has been found that in service it is more hazardous than useful and should be removed from all vessels as soon as possible. It has been found much better to have the rafts so arranged that they are in no way fastened to the ship in order that they may have the best chance of floating free should the vessel sink quickly, or be freely released by tripping the release hook.

**Reinforcing—Water containers.**—All rafts which are not fastened with bolts should be reinforced by lashings properly secured to the slat decking. Where wooden water breakers are lashed into the stowage compartment they should preferably be replaced by tanks accessible from either side as described herein. Where such wooden breakers are not replaced, care should be taken that the bung stopper is securely fastened in place. No spigots should be provided on such water breakers. If fitted they should be removed and the hole securely plugged.

**Lashing equipment.**—At least one of the ration cups now provided on rafts should be checked to determine that it can be entered into the water breaker or water tank in order to preclude any necessity of pouring water from the breaker into the cup. Where on existing rafts the water breaker, distress-signal container, storm oil, sea anchor, first-aid kit, etc., are lashed into a stowage compartment, the lashing should be such that when the equipment is removed and arranged on the deck of the raft a lanyard attaching each item of equipment securely to the raft remains in place.



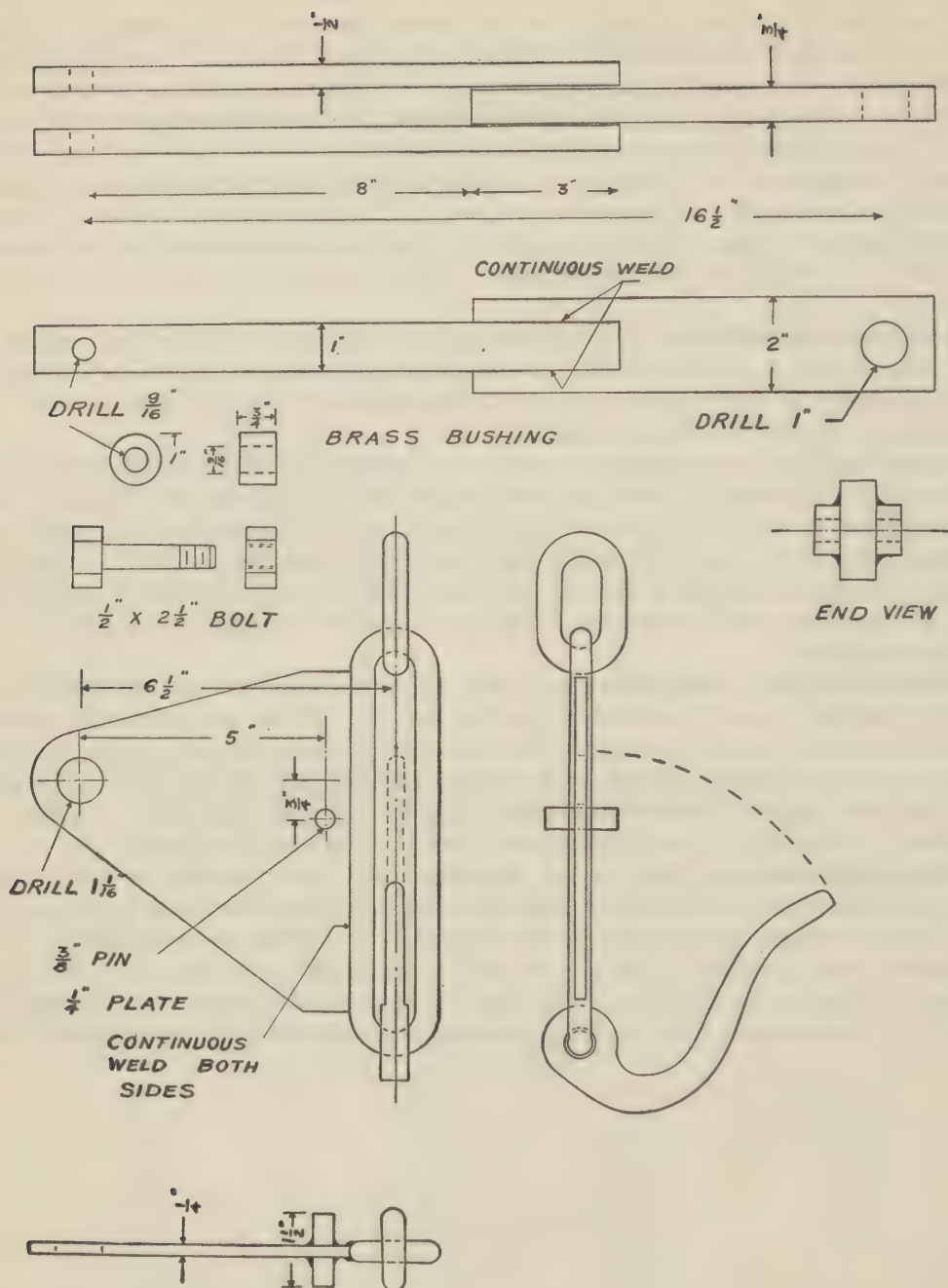


FIGURE 11.—Pelican hook.

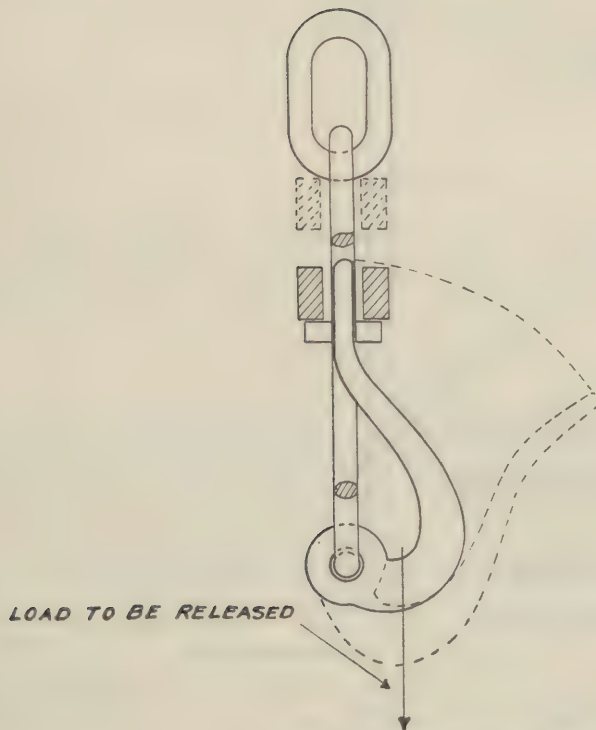
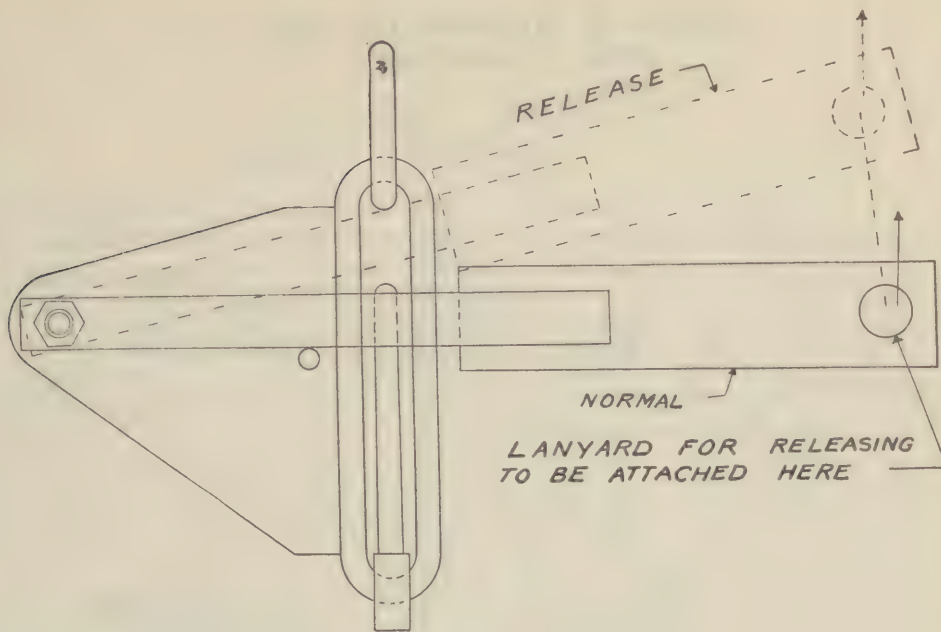


FIGURE 12.—Pelican hook.



### METHOD OF RELEASING LIFE RAFT FROM 2 POSITIONS

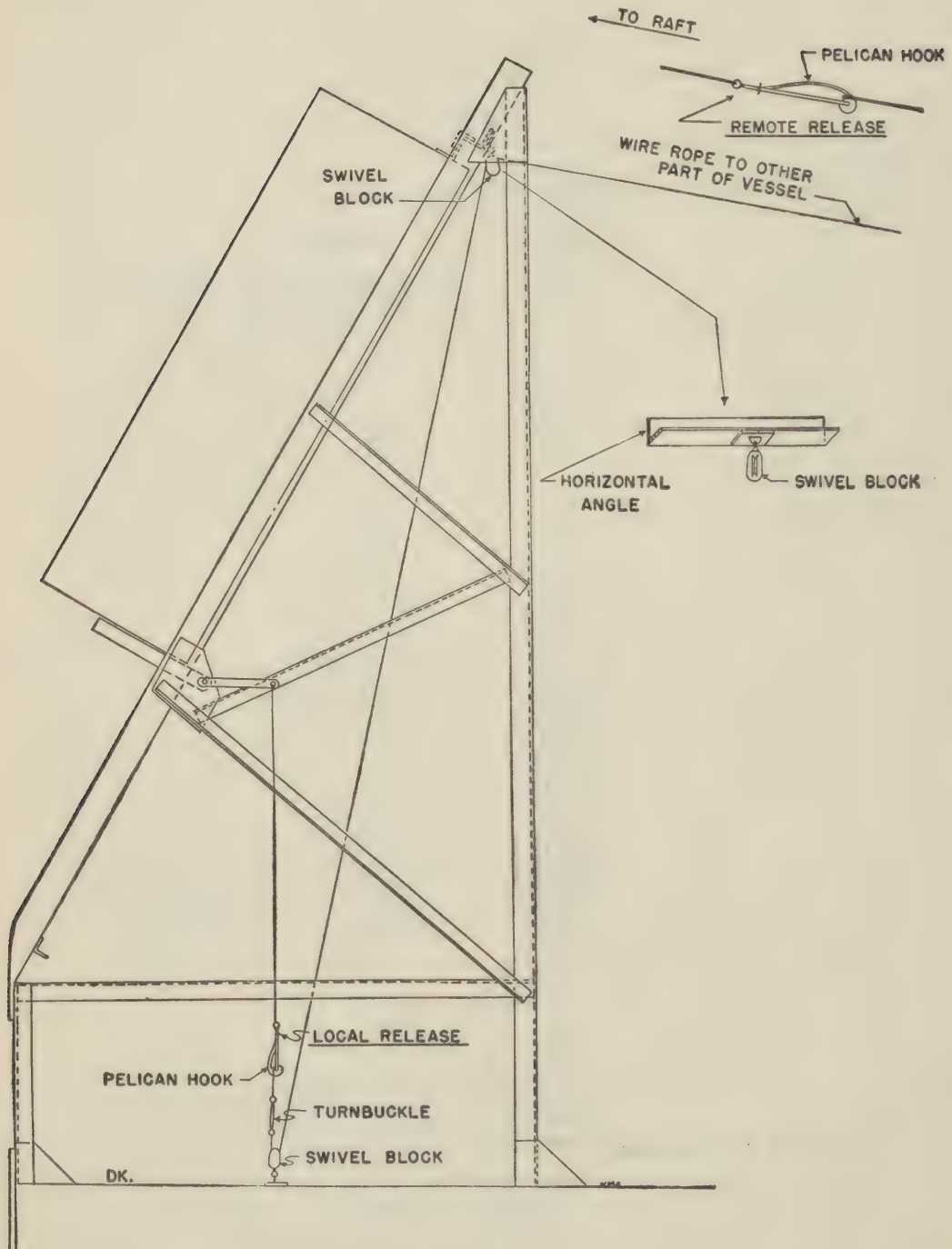


FIGURE 13.—Life raft release arrangement.

## LIFE RAFT EQUIPMENT

### GENERAL

**Lashing arrangements.**—Rafts should be provided with a through ring bolt in each corner for the purpose of lifting and handling when necessary. The painter should be coiled up on one corner of the raft and securely seized with small stuff to prevent its coming adrift unless wanted. In no case should the painter be rove through any block which is fast to the ship or in any way secured to the vessel. On existing vessels where rafts are stowed in such position as to necessitate a degree of lashing in the skidways to hold them against the wash of seas, some means should be provided to immediately, and preferably automatically, release the lashing by cutting or other means. It would be much more preferable if the stowage position could be rearranged to raise the raft higher from the load water line in order that any lashing could be dispensed with.

**Releasing arrangements.**—Several cases have come to the attention of Headquarters where rafts failed to release due to wire lashing between the raft and the skidways. Where bridles are fitted to existing rafts the upper one may be allowed to remain attached to the painter which, as stated above, should be coiled up on the raft and seized. The lower bridles should be carefully made fast to the raft in such a position that there is no possibility of fouling with the trigger-release arrangement on the bottom or catching in the rigging, rail cleats, or projections on the vessel.

**Inspection.**—Equipment should be periodically removed from rafts examined and checked. Water should be changed frequently in the tanks of life rafts. To facilitate checking life-raft equipment a complete list follows.

**Supplementary equipment.**—Reports from survivors indicate that certain supplementary equipment with which they had voluntarily stocked their raft was found extremely useful: A heavy-bladed fish knife; a sizeable piece of light cotton-duck canvas which may be rigged as a sail or used as shelter from the sun; a light pole or two which may be utilized in connection with the canvas. A metal hook of some kind or other on one of these poles was used by two men for picking useful wreckage out of the water.

### BRIDLES

**Bridles.**—Two bridles of  $2\frac{3}{4}$ -inch circumference manila rope attached to rings or shackles for lifting the raft. The painter shall be secured to the bight of one of the bridles so that it may be readily released. (46 C. F. R. 153.7.)

### DISTRESS LIGHTS

**Distress lights.**—A watertight metal case containing 12 self-igniting red lights capable of burning and giving forth a brilliant red flame of not less than 500 candlepower for at least 2 minutes. Each distress light shall be treated and made impervious to moisture, and the manufacturer shall place upon it a statement in clear black letters covering the candlepower and burning range, the directions for firing, the trade name of the distress light, and the name and address of the manufacturer. (46 C. F. R. 59.52.)

NOTE—See relaxations for the duration of the emergency in regards to material of which the container is to be constructed. (46 C. F. R. 153.24.)

**Display—Daytime use.**—While distress lights have approximately a 2-minute burning time and are primarily intended for night use, they emit considerable smoke and may be burned during



the daytime to attract the attention of surface vessels or airplanes which are reasonably close at hand. It is, of course, desirable to hold the distress light as high above the surface of the water as possible and in this connection it may be lashed to the boathook prior to ignition and then held aloft.

**Caution in use.**—When flare is lighted it has a tendency to splatter, and burning molten substances drip from the flare. Care should be taken to prevent this red-hot substance from dropping on occupants of the raft, as it will cause painful burns.

### DRINKING CUPS

**Drinking cups.**—Two enameled drinking cups, one to be suitably marked for measuring in one-half-ounce sections for rationing water. (46 C. F. R. 59.52, 153.7.)

**Type.**—The best type measuring cup is a suitable transparent plastic tube about an inch in diameter closed at one end and provided with a light chain from the top. It should have markings showing one-half-ounce graduations. This type of cup lends itself to being lowered into the water through the bunghole of a water breaker or the opening of a metal water tank, minimizes spillage, and allows the water rationing to be done efficiently.

### DRINKING WATER

**Drinking water.**—At least 3 quarts of fresh water for drinking shall be provided for each person the raft is certified to carry. (46 C. F. R. 153.7.)

**Water containers.**—Drinking water should be stowed in metal tanks stowed in the same position as provision containers with the exception that the drinking-water tanks should be permanently fastened in the structure of the raft and accessible from either deck. Drinking-water tanks should be substantial in character and securely braced. Access should be through an opening fitted with a nipple in a similar manner to that required on drinking-water tanks in new lifeboats. Where water breakers are used, they should be securely lashed and the bungs strapped over with leather or light metal. Water breakers should be fitted with a lanyard long enough to hold the breaker to the raft and aid in lifting it out of the stowage space.

**Renewing drinking water.**—Water should be renewed frequently. Particularly in wooden breakers does it become contaminated by reaction between the water and the wood, especially in the tropics.

**Water tanks—Cleaning—Spray prevention.**—Water tanks should be rinsed free of any soldering acid if the raft is new. The nipple arrangement allows a person to hold his hand over the opening in the interval between dips with the rationing cup and thus keep spray or green sea from entering.

### FIRST-AID KIT

**First-aid kit.**—One first-aid kit consisting of the equipment as listed below, packed in a substantial metal or otherwise suitable container. The container shall be watertight when closed and of substantial construction, not easily damaged or rendered non-watertight. It shall maintain its watertightness when submerged at least 1 foot deep in water maintained at approximately 70° F. for a period of 2 hours. Items of equipment in the first-aid kit provided for life rafts shall be as follows:

One unit, 2-inch bandage compress, four per unit.

One unit, 1-inch adhesive compress, each containing 16 compresses.

One unit, three eye pads, adhesive strips, three tubes eye dressing not less than one-eighth ounce each.

One unit, ammonia inhalant, four tubes, each 2 cc. per tube, and four drinking cups.

One unit, three vials of iodine, 10 cc. each.

Two units, containing tourniquet and forceps.

Two units, 3-ounce tannic acid jelly in not less than 2 tubes (10 percent tannic acid with 5 percent sulphadiazine).

One unit, triangular bandage.

Where one unit is specified above, it shall be contained in a single carton of the dimensions set forth below. Where two units are specified, they shall be contained in two single cartons or one double carton of the dimensions set forth below:

	Length	Width	Depth
Single carton . . . . .	<i>Inch</i> 4	<i>Inch</i> $2\frac{1}{8}$	<i>Inch</i> $\frac{5}{8}$
Double carton . . . . .	4	$2\frac{1}{8}$	$1\frac{1}{4}$

(46 C. F. R. 153.7)

NOTE.—See first-aid instructions under lifeboat equipment.

### FISHING KIT

**Fishing Kit.**—On every ocean vessel of over 3,000 gross tons there shall be provided in each life raft one approved fishing kit consisting of the following equipment:

1 pair gloves, cotton, commercial grade.

1 knife, 2 in. high carbon steel blade, thickness of blade 0.060 in., tempered to test .56 to .60, well riveted into a wooden handle 6 in. long,  $\frac{3}{4}$  in. wide by  $\frac{1}{2}$  in. in thickness. Handle to be smooth and shaped, with a  $\frac{1}{4}$  in. hole in end for attaching 3 ft. of 10-pound cord. Knife must be able to float. Blade to be guarded with a water-proofed paper tube 5  $\frac{1}{4}$  in. long by  $\frac{5}{8}$  in. inside diameter.

1 package containing the following items:

1 sinker, egg-shaped, with  $\frac{7}{64}$  in. hole in center, weight 2 oz., with 3 ft. of 10-pound cord attached to wooden handle containing the abrasive stone.

1 dozen pork rinds, dehydrated strips 4 in. long,  $\frac{1}{2}$  in. wide, ends tapered to approximately  $\frac{1}{8}$  in. and rounded, one end to have two hook-holds cut  $\frac{3}{8}$  in. and  $\frac{7}{8}$  in. from end respectively.

1 # 1/0 O'Shaughnessy hook, attached to 6 in. of # 9 stainless steel wire, other end attached to a # 5 barrel swivel.

1 # 3/0 O'Shaughnessy hook attached to 6 in. of # 9 stainless steel wire, other end attached to # 5 barrel swivel.

1 # 7/0 O'Shaughnessy hook attached to 6 in. of # 9 stainless steel wire, other end attached to a # 2 barrel swivel.

1 # 2 O'Shaughnessy hook, attached to 6 in. of # 5 stainless steel wire, other end attached to a # 5 barrel swivel.

1 # 6 O'Shaughnessy hook equipped with 3 in. of # 5 stainless steel wire, other end attached to a # 5 barrel swivel.

1 abrasive stone, size  $\frac{3}{4}$  in. x  $1\frac{7}{8}$  in. x  $\frac{1}{4}$  in., firmly cemented with waterproof cement into a wooden handle of sufficient size to make the unit buoyant. A  $\frac{1}{4}$  in. hole shall be in the end of the wooden handle, with 3 ft. of 10-pound cord attached.

NOTE: All of the hooks in this package shall be firmly attached to a piece of tapered cork, 1 in. x  $\frac{3}{4}$  in. diameter maximum and attached to the wooden handle containing the abrasive stone.

1 set of instructions shall be printed on PAR-A-PAR paper.

1 dip net, 12 in. deep by approximately 16 in. across the top and bottom when folded flat. Cotton mosquito netting mounted on 12 gauge galvanized market wire. Ends of



wire to be securely fastened in a round wooden handle 4 in. long by 1 in. in diameter, tapered both ends. Over-all length of net folded not over 16 in., to be folded once to approximate packing length of 8 in.

3 ft. of 10-pound cord to be attached to the handle and the front end of net.

1 fishing rig # 1, 1/8 in. winder, pressed wood or equivalent, containing 100 ft. of Ashaway 15-pound nylon line or equivalent; 1 # 6 O'Shaughnessy hook rigged with 3 in. # 5 stainless steel wire and a # 5 barrel swivel attached. A split buck shot mounted on line about 6 in. above hook.

1 fishing rig # 2, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of # 12 Ashaway white cotton shore line, or equivalent. Equipped with a stubbed mackerel squid jig mounted on a 1/0 O'Shaughnessy hook equipped with 6 in. of # 5 stainless steel wire with a # 5 barrel swivel attached. (NOTE: Hook on this line should be light colored.)

1 fishing rig # 3, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of # 24 Ashaway white shore line, or equivalent. Equipped with a 1-ounce feather jig with white rubber skirts, chrome plated head, rigged with a 3/0 O'Shaughnessy hook with 24 in. of # 9 stainless wire leader and a # 5 barrel swivel attached.

1 fishing rig # 4, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of # 24 Ashaway white cotton shore line, or equivalent; equipped with a # 1/0 O'Shaughnessy hook on 5 in. # 9 stainless steel wire with # 5 barrel swivel attached. A 2-ounce egg-shaped lead sinker with a 7/64 in. hole mounted on a line about 18 in. above hook with knot tied above and below lead.

1 fishing rig # 5, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of # 24 Ashaway white cotton shore line, or equivalent. Equipped with a # 7/0 gang hook and a 1-ounce egg-shaped sinker, with 7/64 in. hole. Mounted on the line so that this sinker lies directly under the hooks.

1 fishing rig # 6, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of # 48 Ashaway white cotton shore line, or equivalent, equipped with 1 1/2-ounce feather jig rigged with a 6/0 O'Shaughnessy hook on 2 ft. of # 9 stainless steel wire and # 2 barrel swivel.

1 fishing rig # 7, 1/8 in. winder, pressed wood or equivalent, with 100 ft. of # 48 Ashaway white cotton shore line, or equivalent. Equipped with a specially constructed spear of approximately 7 in. over all in length, special constructed barb on one end with an open eye on the other end, and a "U"-shaped attachment brazed to the side of the spear to accommodate blade of oar or paddle. This item should be constructed of a good grade of commercial steel, the barb to be rounded at the end and back to be concave; protected with a waterproofed paper tube to be 4 3/4 in. long and 5/8 in. inside diameter.

1 bib, width across bottom 28 in., width from end of flap to end of flap, 36 in. Width across the top 30 in. Length from top of bib to bottom, 15 in. Bib shall contain 12 pockets in which each of the items shall be inserted. All of the edges shall be hemmed and double stitched. Fastened to the end of the left-hand flap shall be a rayon tape 18 in. long by 1/8 in., securely sewn. Fastened to the right-hand flap shall be 2 rayon tapes, 18 in. long by 1/8 in., securely sewn. 7 1/2 in. from each corner of the top of the bib shall be firmly sewn a rayon tape 24 in. long by 1/8 in. The bib shall be made of olive drab cotton cloth, herringbone twill, weight per square yard 8.5, minimum thread count per inch in warp 72, in filling 46; breaking strength in warp 125 pounds, in filling 85 pounds. The test to be made by 1 x 1 x 3 Grab Method.

All material shall be packed in a metal waterproof key opening can. A 3/4 in. ring which shall hinge back flat shall be soldered on the bottom of the container.

Note.—Each rig shall be marked with saw-cuts on both sides of winder for identification. All hooks and swivels to be attached with at least 6 turns of the wire. All lines attached to swivels with a surfman's hitch with three wraps. All fishing hooks to be bound to rigs with scotch tape. (Approximate weight of kit, packed, 3 1/2 pounds.)

The container shall bear the manufacturer's name or trade-mark, together with the following inscription:

**"EMERGENCY FISHING KIT  
OPEN ONLY FOR ACTUAL EMERGENCY USE"**

(46 C. F. R. 153.7.)

NOTE.—See fishing instructions under lifeboat equipment.

### LIFE LINE

**Life line.**—One life line properly secured entirely around the sides and ends of the raft, festooned to the gunwales in bights not longer than 3 feet with seine float in each bight. (46 C. F. R. 59.52.)

**Life-line arrangement.**—While the regulation calls for bights to be "not longer than 3 feet," it is recommended that they be shortened to approximately 18 inches, particularly when one line is strung around the half draft of the raft. Life line should not be secured to rafts by staples. It should preferably be rove through holes in the raft structure or secured in eye bolts and properly seized. The seine floats should be secured at the center of each bight.

### MANILA LINE

**Manila line.**—At least 15 fathoms of 12-thread manila. (46 C. F. R. 153.7.)

**Lashed at raft-side.**—A similar comment as set forth under this item of lifeboat equipment is applicable. The line should be coiled and lashed at the side of the raft in such a position that it is accessible whichever way the raft may float.

### MATCHES

**Matches.**—One box of friction matches in a watertight container. (46 C. F. R. 59.52.)

**Containers—Type.**—Containers provided for the matches should be of a type which may be opened and resealed watertight again in order that matches may be used and replaced again in a dry container.

### OARS

**Oars.**—Four oars (46 C. F. R. 59.52.)

**Suitable oars—Lashing.**—The oars provided on life rafts should preferably be of a light spruce and short enough to be properly used and, if necessary, used as paddles. They should be lashed on the side of the raft in such a position that they will be accessible in whichever position the raft may float.

### PAINTER

**Painter.**—One painter of manila rope not less than  $2\frac{3}{4}$  inches in circumference and a length of not less than three times the distance between the boat deck and the light draft. (46 C. F. R. 59.52, 153.7.)

**Securing painter.**—Painters for life rafts should be kept ready for use at all times while at sea. Painters should not be made fast to the ship by taking turns around cleats, bitts, or other objects. The ends of painters should be secured with a breakable lashing where they will be readily available



when launching rafts, and arranged so that they will not draw the raft under in the event the ship sinks before the rafts are launched. Due to the risk of fouling, painters run through a block at the crosstree and led down to the mast table should not be fitted.

### PROVISIONS

**Provisions.**—The provisions, consisting of hard bread or U. S. Army ration, shall be removed from the life rafts and the following provisions shall be provided for each person the raft is certified to carry:

(1) Fourteen ounces of biscuits known as "Type C" ration covered by U. S. Army specifications.

(2) Fourteen ounces of pemmican covered by specifications for U. S. Navy aircraft emergency ration pemmican.

(3) Fourteen ounces of chocolate tablets in waterproof packages or containers, or an additional fourteen ounces of biscuits "Type C" rations covered by U. S. Army specifications.

(4) Fourteen ounces of milk tablets in waterproof packages or containers.

(5) The provisions shall be stowed in airtight receptacles as heretofore.

(6) Equivalents in calorific value may be substituted for pemmican required by item (2) and the milk tablets required by item (4) or both, provided that the substitutes and packing are satisfactory for lifeboat use. Samples of proposed substitutes shall be submitted to the Commandant for approval. (46 C. F. R. 153.7.)

**Packing of provisions.**—Provisions should be packed in the same manner as in lifeboat provision containers, types of individual containers and packages of each ration being identical with those provided for use in lifeboats.

### PROVISION CONTAINERS

**Provision containers.**—An airtight receptacle of metal fitted with an opening in the top not less than 5 inches in diameter and provided with a screw cap of heavy cast brass with a machine thread and attached double toggle seating to a pliable rubber or felt gasket which will insure a tight joint. (46 C. F. R. 59.52.)

**Number of containers—Stowage.**—No objection will be raised to the interpretation of the above regulation to provide provisions in more than one container, and designed to be removable from the stowage space, weighing not more than 10 pounds when packed. Where permanently fixed containers are provided, access openings should be fitted on either side of the raft. In such cases, it is recommended that the required provisions be stowed in at least two separate fixed containers. The dispersal of stocks and provisions of water in separate tanks on both boats and rafts is recommended in order that damage may not cause the loss of the total amount of rations or water provided.

### ROWLOCKS

**Rowlocks.**—Five rowlocks attached by separate chains. (46 C. F. R. 59.52.)

**Construction—Fitting.**—Rowlocks should be constructed of suitable material such as bronze or grade A malleable cast iron. Rowlocks of this latter material will not break if hammered sharply. Rowlocks which are not properly malleableized will snap very easily if hammered. The fastening of rowlock sockets or check pieces in wooden gunwales should be adequate. Two short wood screws are obviously not sufficient to hold the socket in place. Rowlocks should be designed with a sufficiently long shank, at least  $1\frac{1}{2}$  times as long as the maximum width of the crutch. Malleable rowlocks should be hot-dipped galvanized and attached by galvanized chain of sufficient length.

## SEA ANCHOR

**Sea anchor.**—One sea anchor constructed of good quality canvas or other satisfactory material, and if of a circular pattern, it shall be not less than 2 feet in diameter. (46 C. F. R. 59.52.)

**Construction.**—The weight of canvas and method of construction of the sea anchor should be the same as that required for use in lifeboats. No riding line need be furnished as the painter will serve this purpose.

## SELF-IGNITING WATER LIGHT

**Self-igniting water light.**—One self-igniting water light of approved type. (46 C. F. R. 59.52, 153.22.)

**Type—Electric water lights.**—As required by section 153.22 of subchapter O, chapter II, title 46, C. F. R., as cited in this publication under Special Equipment, titled "Removal of Calcium Water Lights," all self-igniting water lights on ocean and coastwise vessels are to be of an approved type and operated by electricity.

**Method of rigging.**—Unless the light is properly rigged in such a manner as to effectively function when the raft is launched, the usefulness of life rafts in the nighttime will be very greatly diminished due to the fact that survivors will be unable to locate them. Electric water lights fitted on rafts should, therefore, be so rigged as to positively float free of the raft in the lighted position when the raft is launched. In order to accomplish this purpose, it is necessary to attach a lanyard at least two or three fathoms in length up to the top or head of the raft on the forward side. The light itself should be placed in its socket or bracket on a board or plank fastened outside the rail approximately 10 feet forward of the raft skid.

## SIGNAL FLAG

**Signal flag.**—One yellow or bright orange bunting flag to be attached to a pole to attract aircraft. (46 C. F. R. 153.7.)

**Size—Use.**—Signal flags for life rafts should preferably be constructed of light waterproof material, the waterproofing to be orange or yellow in color. It should be at least three-fourths the size of the raft in order that it may be utilized as shelter from the sun. Survivors on rafts can, of course, cut off a piece in the form of a pennant to be attached to an oar when rigged as a mast. See recommendations and comments concerning material of signal flag under this item of equipment for lifeboats.

## SIGNALING MIRRORS

**Signaling mirrors.**—Two stainless steel or other suitably polished metal mirrors having at least 20 square inches of reflecting surface on each side. The mirrors shall be heavily coated with a neutral preservative grease and wrapped in a waterproof container plainly marked "signaling mirrors." (46 C. F. R. 153.7.)

**Desirability of light reflectors.**—Pocket mirrors, bright pieces of tin, flattened tin cans on the blade of an oar, or other shiny devices have been responsible for rescuing persons adrift on rafts or boats during the present war. Flashes from such articles can be readily seen by observers and pilots in airplanes and by men on the bridge of surface vessels. It is desirable, if possible, that the flash be yellowish in color, rather than the same bluish tint which comes from wave surfaces. Yellow-tinted mirrors bordering on reddish hues should prove most efficient.

**Distance effective.**—It is not possible to lay down definite limits of effective distances from flasher to observer. However, in relatively clear atmosphere these flashes may be observed at a distance of approximately 10 miles.



**Line of flash.**—Obviously, the observer can best see the flash when he is directly in line between the sun and the flasher. (Call this “zero degrees.”) Conversely, the observer cannot see the flash at all if the position of the flasher is directly in line between himself and the sun. (Call this “180 degrees.”) Flashes can be effectively seen from 0 degrees up to about 135 degrees or about three-fourths of the total arc; that is, in most of the angles which an airplane observer will be to the flasher.

NOTE.—See sighting instructions (fig. 9) and description of suitable mirrors under this item of lifeboat equipment.

### STORM OIL

**Storm oil.**—One container holding 1 gallon of vegetable or animal oil so constructed that the oil can be easily distributed on the water, and so arranged that it can be attached to the sea anchor. (46 C. F. R. 59.52.)

**Containers—Distribution—Suitable oils.**—The same recommendation which appears under this item for lifeboats applies to life rafts.

### BULLET-HOLE PLUGS

**Wooden plugs.**—Twenty-five soft wood plugs 3 inches long, tapered from one-fourth to three-fourths inches in diameter, to plug bullet holes in air tanks. (46 C. F. R. 153.7.)

**Rags—Adhesive tape.**—Experience has shown that in addition to the wooden plugs, a quantity of rags is most desirable to wrap around the plugs when used for closing up jagged holes in tanks. A roll of adhesive tape of approximately 2 inches in width would also be a desirable accessory.

## LIFE FLOATS

### NUMBER—EQUIPMENT—STOWAGE

*Number, equipment and stowage.*—On each mechanically propelled vessel of 1,000 gross tons and over, there shall be provided at least 2 approved doughnut-type life floats of at least 15-person capacity. These floats shall be stowed in such location that they may be launched directly overboard and so arranged that they would have the best chance of floating free of the ship if there is no time to launch them. An electric water light of an approved type shall be attached to each float by a suitable lanyard. At least two paddles are to be lashed to the sides of the float. The usual stowage for such floats is to be aft. One float may, however, be stowed in such other position as may be designated by the master. (46 C. F. R. 153.25.)

*Color of water lights.*—Water lights attached to life floats and life rafts show a white light. The life preserver light being red thus enables men to distinguish floating buoyant equipment from personnel.

*Method of rigging and release.*—Water lights on life floats should, in all cases, be rigged so as to be released in the same manner as water lights on life rafts.



## LIFE PRESERVERS

### NUMBER—STOWAGE

**Number, stowage.**—All vessels, shall, in addition to having a life preserver for each person allowed to be carried, be provided with life preservers stowed on the boat deck for at least 25 percent of the total number of persons. These life preservers shall be stowed in chests so as to be readily accessible and in a manner as to float free of the vessel. The covers of the chests shall be of the “lift-off” type to insure release of the life preservers. On towing vessels, manned barges, and miscellaneous craft, stowage may be on the uppermost deck. (46 C. F. R. 153.2.)

**Wearing of kapok type.**—On vessels of over 1,000 gross tons which are required by these regulations to carry an approved lifesaving suit for each person on board, the approved kapok jacket, which is an integral part of the approved lifesaving suit, should be worn at all times when the vessel is outside inland waters. The lifesaving suit should, of course, be readily accessible and in a position as near as possible to the station or place of work. Life preservers should be kept clean and dry in order that the kapok may be maintained in the best condition possible.

**Wearing of other types.**—On vessels not equipped with lifesaving suits the approved life preservers required to be carried should be worn or placed close at hand in order that they may be readily accessible at all times when the vessel is outside inland waters.

**Distribution.**—The additional life preservers provided on board in accordance with the provisions of the above regulation should on passenger vessels be distributed around the vessel in a manner calculated to provide for their accessibility in a number of places. While the regulation reads “chests” it may be properly interpreted to allow the stowage of some of these additional preservers in places in and adjacent to the engine-room boiler space and the upper gratings and alley ways, in various public spaces in the officers’ and crew’s accommodations. The regulation does not mean that all life preservers should be stowed in one chest located on the boat deck, as has been found to be the case on many vessels. On cargo vessels where the additional number, as required by the subject regulation, does not amount to more than perhaps 10 or 12, it is most strongly recommended that supplementary kapok jackets be voluntarily supplied and distributed as above.

**Stowage chests.**—Obviously chests constructed to be watertight or semiwatertight will not readily allow life preservers to float free even though the cover may be of the lift-off type. Covers should not be hinged. They should be constructed of wood and the chest should have a sufficient number of holes in it to allow the entrance of water and to give immediate buoyancy to the preservers. Chests should be securely lashed in order that they may not slide over the side and perhaps into a lifeboat should the vessel take a sudden list. This has already happened in one or two cases. The additional life preservers would better serve their purpose if they were placed in smaller chests adjacent and inboard from each lifeboat.

## SPECIAL EQUIPMENT

### PORTABLE EMERGENCY RADIO TRANSMITTERS

**Emergency radio installation.**—There shall be available and readily accessible (other than in a lifeboat) on board mechanically propelled vessels of over 1,000 gross tons for use in lifeboats at least one portable radio installation which complies with the requirements of the Federal Communications Commission or in lieu thereof there shall be located in at least one lifeboat on each side of the vessel at all times while at sea a radio installation (in portable form or permanently installed) which complies with the requirements of the Federal Communications Commission for this purpose. (46 C. F. R. 153.23.)

**Stowage—Use.**—The portable radio should be stowed in a safe and accessible location designated by the master. Alternates should be designated to take care of getting the radio away and into a boat in an emergency. It should not be used by survivors in a lifeboat until sufficient time has elapsed to allow submarine to proceed away a reasonable distance from scene of action.

**Antenna rigging—Height essential.**—The diagrams accompanying the portable radio transmitter should be followed in erecting the antenna and in this connection it should be borne in mind that transmission, to be efficient, depends on the proper erection of the antenna with the portable topmast provided. Types of suitable masts with details are shown in figures 14A, 14B, 14C, and 14D. If portable masts are not available, a boathook or oar should be lashed to the top of the mast to secure additional height.

**After mast.**—A boathook or oar erected in the after end of the boat to simulate a short after mast to which the antenna can be attached will further improve efficiency and keep the antenna up out of the way. It will be noted that insulated wire is used which precludes the possibility of any shock to the boat's company if the antenna is accidentally touched while transmission is going on.

### ABANDON-SHIP KIT

**Abandon-ship kit.**—All vessels of 3,000 gross tons and over shall carry at least two abandon-ship kits. The articles composing the abandon-ship kit, as listed below, shall be packed in a compact manner in a watertight container. Unless the container is of such nature that tampering will be readily evident, it shall be provided with a seal over the opening device. The kit shall be fitted with a shoulder-carrying strap or equivalent and, as packed, shall be sufficiently bouyant to float if dropped overboard. It shall be prominently marked and the predominant outside coloring of the case or container shall be orange or chrome yellow. The kit shall contain the following articles:

Twenty one-quarter grain syrettes of morphine.

Forty-eight one-half gram tablets of sulfadiazine in bottle.

Ten Navy type, watertight packages containing 21½ grams of crystalline sulfanilamide.

Four ounces of approved oil cleansing solution in bottle having a screw cap.

Five four-ounce tubes of 5 percent sulfadiazine-tannic acid 10 percent jelly.

Two chemical heating pads of approved type.



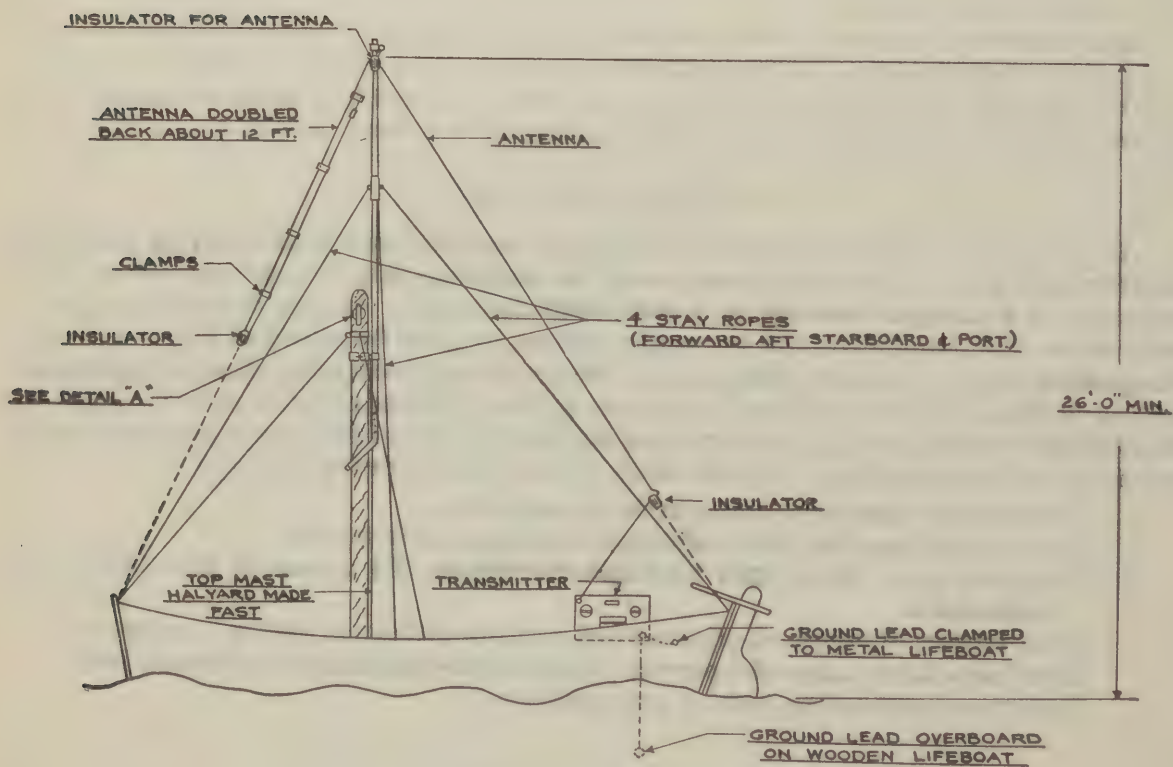
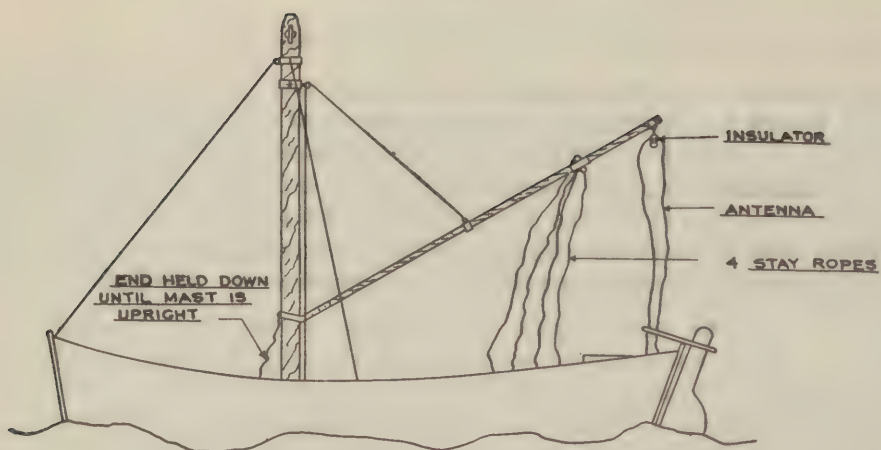
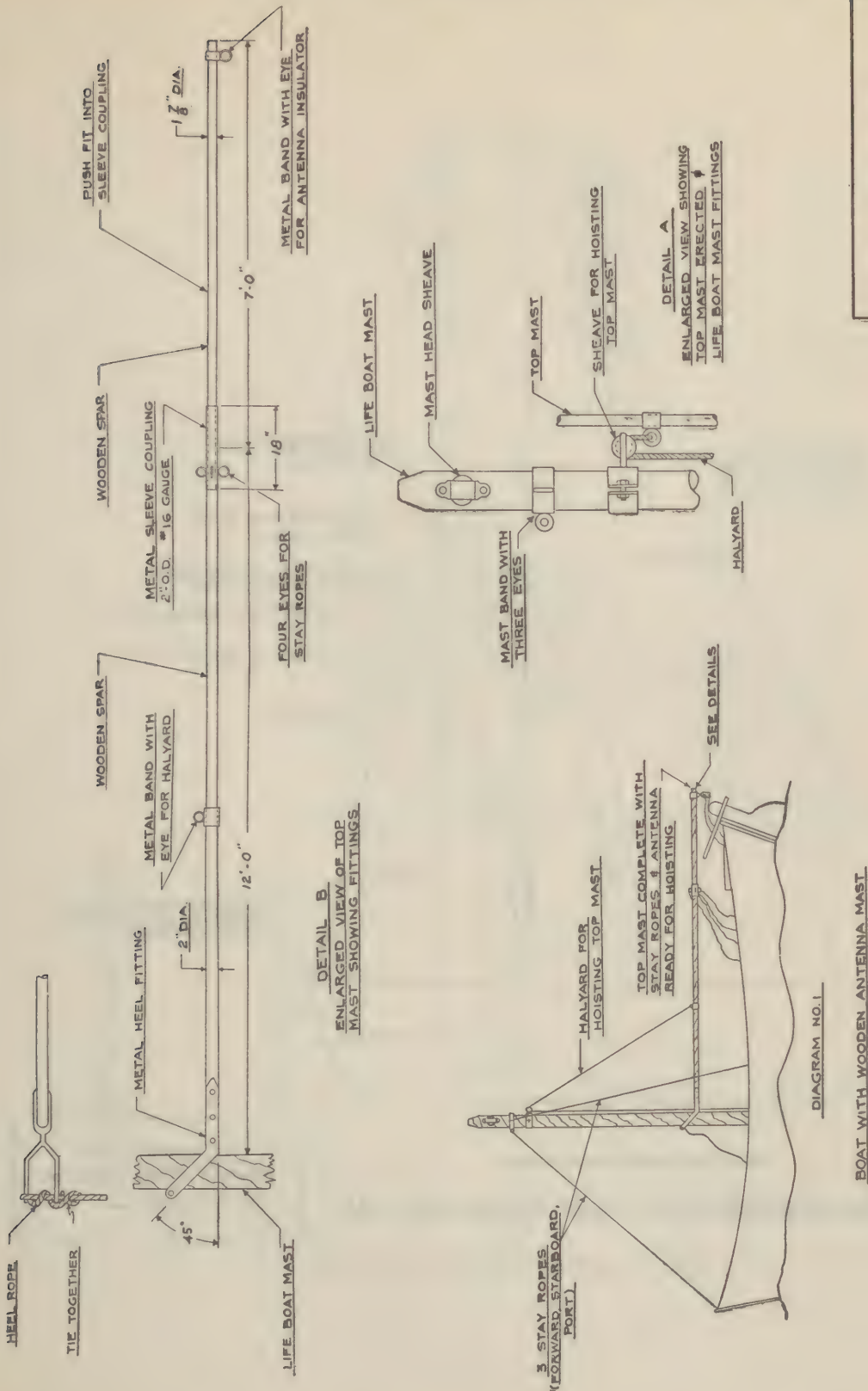


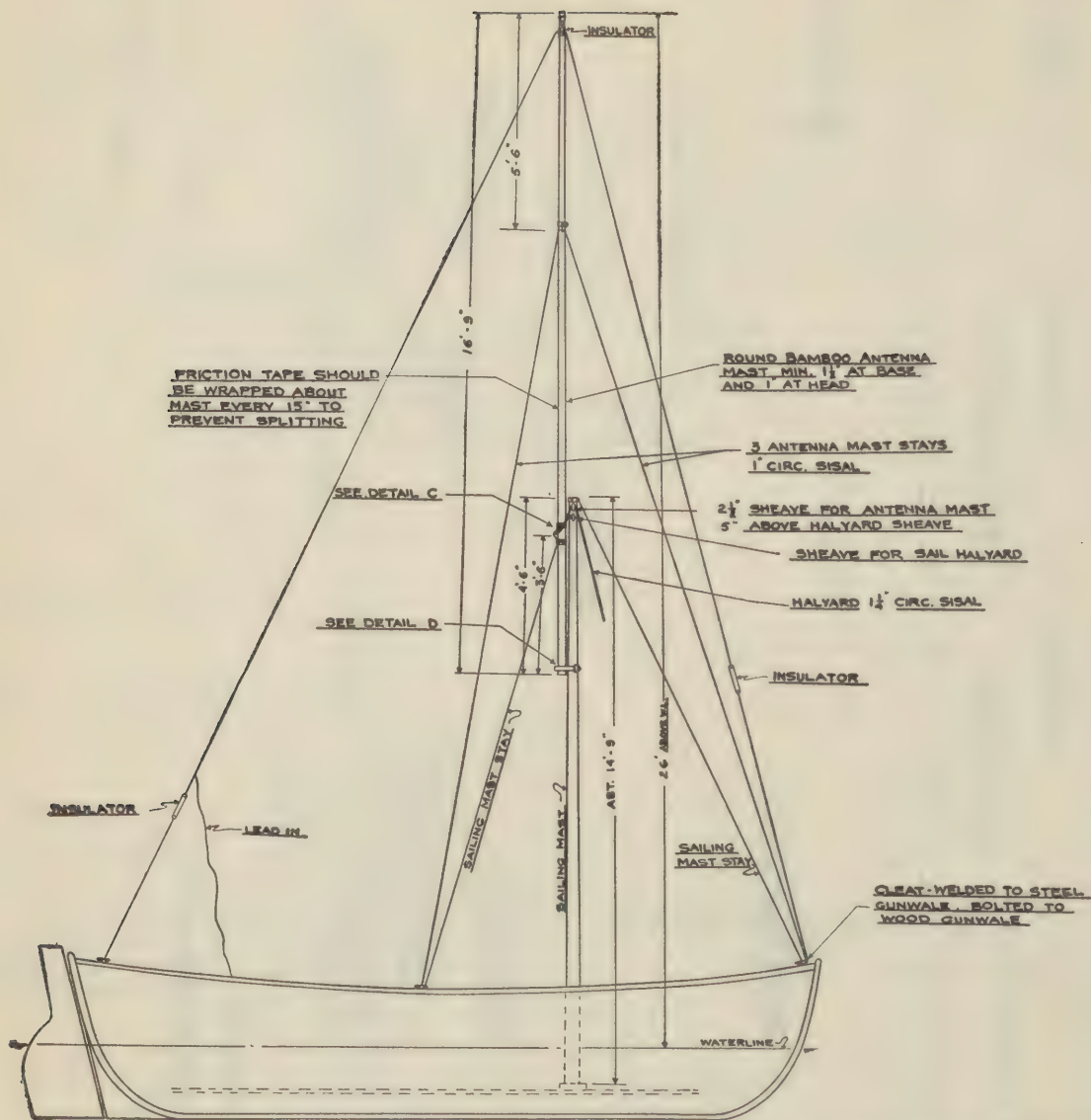
FIGURE 14.—Arrangement for lifeboat antenna mast (wooden).



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Figure 14A.—Detail arrangement for lifeboat antenna mast (wooden).





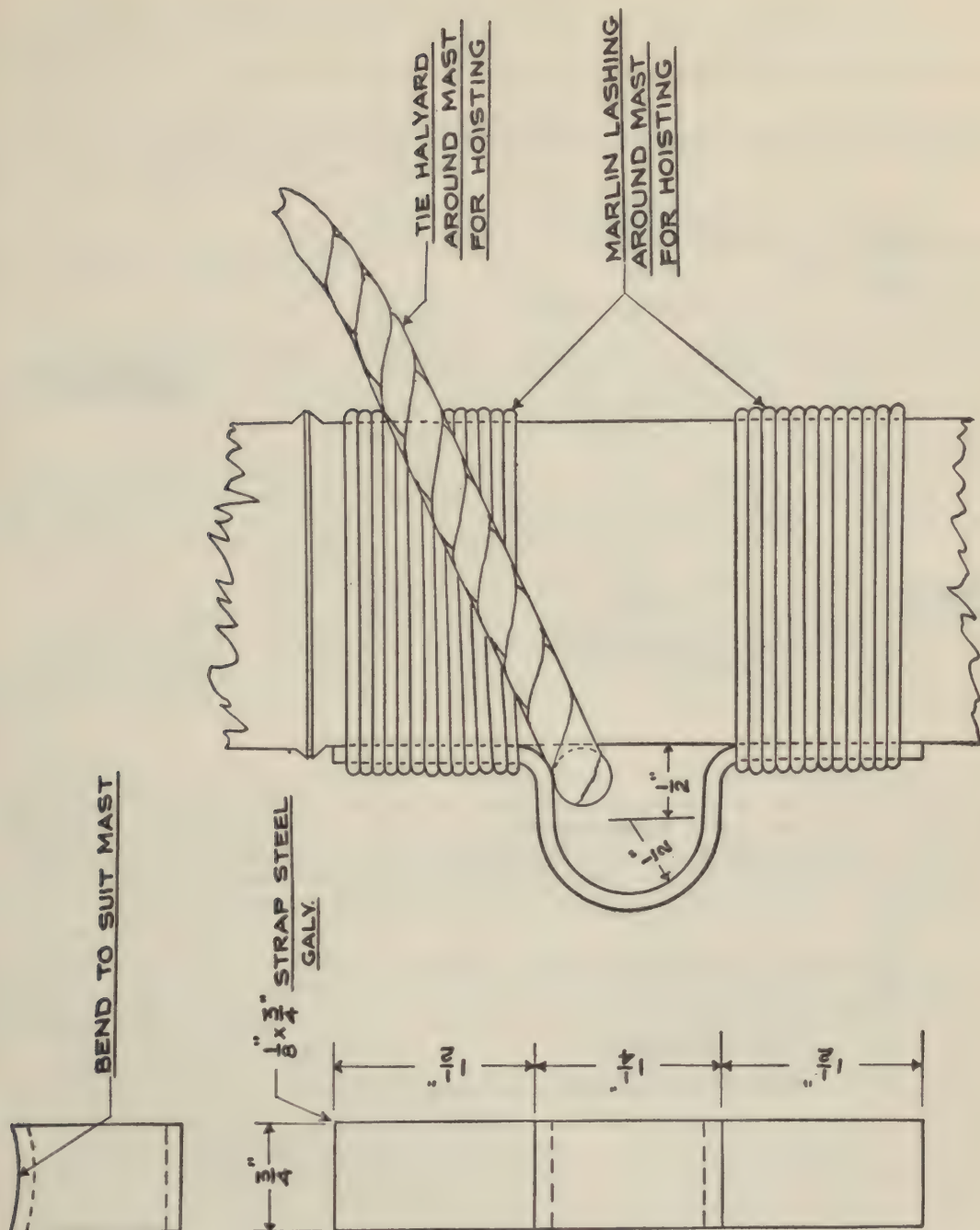
BOAT WITH BAMBOO ANTENNA MAST

SUITABLE ARRANGEMENT FOR LIFEBOAT ANTENNA MAST - 14B

U. S. COAST GUARD  
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DECEMBER 1942

FIGURE 14B.—Arrangement for lifeboat antenna mast (bamboo).



## HALYARD EYE

FIGURE 14C.—Detail of halyard eye for bamboo antenna mast.





There shall be included in each kit three printed copies of the following instructions:

**Directions for Giving Morphine**

1. Remove the transparent shield from end of syrette.
2. Holding wire by the loop, push wire through the needle into the syrette, thus breaking the seal. Withdraw the wire.
3. Stick the needle under the skin of the arm or shoulder at an angle of 45° and squeeze syrette until tube is flat.
4. Withdraw the needle and throw the syrette away.
5. After the first dose additional injections may be given every three hours as long as necessary. First dose may be doubled if man is badly injured.

**Directions for Using Sulfadiazine Tablets**

Each wounded or burned man should be given a single dose of eight of the sulfadiazine tablets. No more sulfadiazine should be given.

**Directions for Sulfanilamide Powder**

Open one of the packages of sulfanilamide and sprinkle the powder directly into the wound, after which a compress and bandage may be applied. Sulfanilamide is a powerful and effective antiseptic and if properly used will arrest and prevent infection which might otherwise prove fatal.

**Directions for Using Oil Cleaning Solution**

The solution is supplied for the purpose of removing fuel oil or like substance from the eyelids, nose, and lips. A pledget of cotton or a small piece of cloth dipped in the solution should be saturated and lightly rubbed over the skin surface until the oil is removed. To allay or prevent infection or irritation of the eyes from fuel oil, the eye ointment provided in the first-aid kit should be used.

**Directions for Using Tannic Acid Jelly**

Apply thick layer of jelly to gauze compress of sufficient size (obtained from first-aid kit) to completely cover the burned area. Lay this dressing on the burn and hold in place with a bandage loosely tied. On small burns the jelly may be used without a dressing, if desired. If, when it is necessary to change dressing, there is a tendency to stick, soak the compress in fresh or sea water to loosen it and prevent injury to the area.

**Directions for Using Chemical Heating Pads**

Chemical heating pads are furnished for the purpose of supplying heat to the bodies of persons suffering from shock. Shock is a disturbance of the nervous and circulatory system which follows injury. The shock in itself may be more severe than the injury. Treatment of the shock is most important and the patient must, in all cases, be kept warm. A chemical heating pad should be utilized to apply heat locally to the abdomen and groin. Care should be taken not to burn the skin, especially of an unconscious person. The pad should be wrapped, if necessary, in cloths or clothing. For details of heating pad operation see directions on heating pad.

Abandon-ship kits shall be stowed in separate locations as designated by the master who shall instruct officers in charge of boats regarding understood arrangements as to securing a kit, should it become necessary to abandon the vessel. (46 C. F. R. 153.14a.)

**Oil cleansing solution.**—There are two approved oil cleansing solutions available at the present time. They are Orvus (5 percent solution) manufactured by Procter & Gamble, and Ninol-737 (2 percent solution) manufactured by Ninol Laboratories, 510 Dearborn Street, Chicago, Ill.

**Additional equipment.**—Care should be taken that the abandon-ship kit is not overburdened with too much additional equipment. Survivors have again and again recommended that cigarettes be set aside to take into boats. Smoking tobacco has a deleterious effect in that it makes the person using it more thirsty; however, the beneficial effects are felt to outweigh the disadvantages. Cigarettes can, of course, be placed in the abandon-ship kit container as space is available for them. In this connection it would be recommended that tins of cigarettes affording moistureproof reclosure should be utilized as the moist sea air in a lifeboat will, otherwise, make them so damp that they will be almost useless. Other additional medical supplies, such as aspirin and quinine, may be added to the contents



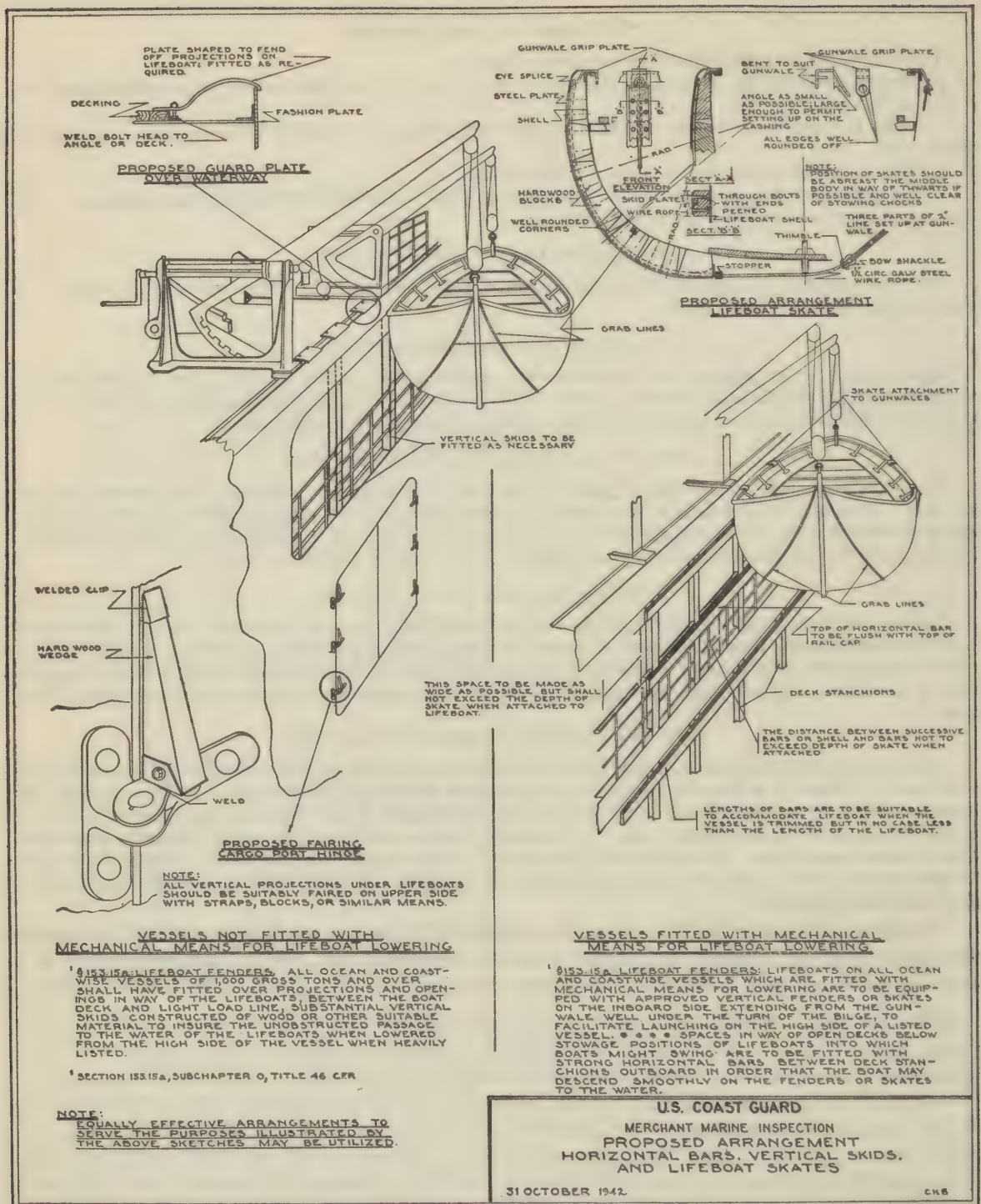


FIGURE 15.—Vertical skids and lifeboat fenders.

of the abandon-ship kit, as desired. The usefulness of chewing gum in allaying thirst and calming nerves has been testified to by many survivors and its voluntary inclusion in the contents of the kit would seem most desirable.

**Buoyancy of kits.**—Care should be taken by the manufacturer not to include so many additional items of the above nature that the kit will lose its buoyancy. After the items are provided and in place, the manufacturer should test the kit for buoyancy.

**Sealing.**—The regulation requires the kit to be sealed at all times in order to prevent tampering with the contents and to insure that all supplies will be available and intact for use in an emergency. The seal may, of course, be broken by the master of the vessel for examination of the kit or for the inclusion of additional articles. The kit should be stowed in a dry, cool place. The seal should be periodically checked.

NOTE.—The seal used may be any suitable recognized type of sealing device embodying the conventional type of metal seal or the wax type commonly used by the United States Customs.

### LIFEBOAT SKIDS—FENDERS—SKATES

**Skids on ship's side.**—All ocean vessels of 1,000 gross tons and over shall have fitted over projections and openings in way of the lifeboats, between the boat deck and the light load line, substantial vertical skids constructed of wood or other suitable material to insure the unobstructed passage to the water of the lifeboats when lowered from the high side of the vessel when heavily listed.

**Boat fenders—skates.**—Lifeboats on all vessels which are fitted with mechanical means for lowering are to be equipped with approved vertical fenders or skates on the inboard side extending from the gunwale well under the turn of the bilge, to facilitate launching on the high side of a listed vessel. Such fenders are to be sufficient in number to prevent damage to the boats while being lowered. Fenders or skates are to be designed so as to be light in weight and shall be so fitted as to be easily detached after the lifeboat is afloat. If wooden fenders are fitted they shall be made of the best grade of oak or equivalent hardwood. Spaces in way of open decks below stowage positions of lifeboats into which boats might swing are to be fitted with strong horizontal bars between deck stanchions outboard in order that the boat may descend smoothly on the fenders or skates to the water. (46 C. F. R. 153.15a.)

Note.—See figure 15.

### LIFESAVING NETS

**Lifesaving nets.**—On all mechanically propelled vessels of over 1,000 gross tons, there shall be provided for each set of davits a lifesaving net or nets aggregating at least 10 feet in width to reach from the rail to the light load line. Steel nets shall be made in sections having a width of 5 feet. On and after January 31, 1943, all new installations or replacements of lifesaving nets shall be of an approved type. (46 C. F. R. 153.17.)

**Rigging.**—While the above regulations do not call for the fitting of any distance pieces, it should be borne in mind that the purpose of the net is to provide a ready means of getting up or down over the side, if necessary. It will serve its purpose best, therefore, if fitted with blocks or spreaders which will keep the mesh spread and hold it away from the hull a sufficient distance to allow easy climbing. There is obviously no time to fool with each rung of mesh trying to get a toehold on it. As to the position from which the net should be rigged, it appears to be a problem to be solved on each individual ship. The ladders provided by these regulations are required to be rigged from the boat deck, in order to ensure that means will be provided for the men who are lowering the boats to leave the vessel. The lifesaving net required for each set of davits should, on the other hand, be rigged in such



position that it will roll down to where the boat should lie after coming back and lying to the sea painter. It should be rolled up on the outside and lashed in such manner that it may be readily let go with one release line. Some ingenuity in this connection should be exercised. Tapered wooden toggle pins fitted to straps or other slipknot arrangements may be employed.

**Drills.**—At lifeboat drills nets should be released and the ladders released and the crew encouraged to practice climbing on them. It is only in this way that the best arrangement of distance pieces and the preferable location of all of this equipment can be determined.

**Bottom weight.**—It is desirable to weight the bottom of the net but in this connection care should be taken that the weight fitted will not be likely to damage the boat.

**Sizes.**—The minimum size rope for lifesaving nets should be a 2-inch circumference manila border or bolt rope with a mesh of not less than 15-thread manila. Where 15-thread manila is used for the mesh, the spacing should not exceed 6 by 8 inches. There is no objection, however, to spacing of 10- by 10-inch with 18- or 21-thread manila. Where sisal is used for the construction of lifesaving nets, size of the rope should be increased 25 percent.

**Release—Simultaneously with boat gripes.**—Experience has shown that the best method of rigging lifesaving nets is to rig them from the boat deck in such a manner that they are rolled up and will be tripped to unroll over the side at the same time that the boat gripes are released. This arrangement can be worked out by the use of the ingenuity which seamen possess. It should, of course, be simple and foolproof.

### EMBARKATION LADDERS

**Ladders.**—Cargo vessels and tank ships shall be provided with suitable ladders to enable persons to descend to lifeboats and rafts, one ladder to be provided for each set of boat davits. These ladders shall be kept ready and convenient for use on the boat deck and shall reach to the vessel's light load water line. (46 C. F. R. 153.2.)

**Treads—Distance pieces.**—Ladders most suitable for emergency use should have flat treads preferably at least 4 inches across. Ladders should be provided with distance pieces giving at least a distance of 6 inches from the outside edge of the rung to the side of the ship when the ladder lies down over the side of the hull.

**Inspection.**—The treads of ladders should be kept free from oil and grease and roughened by the addition of ridges or other types of safety tread. Periodical tests of all ladders should be conducted in order to determine whether or not any latent imperfections have developed.

### LIFESAVING SUITS

**Lifesaving suits.**—Cargo and tank vessels of over 1,000 gross tons shall be provided with one approved lifesaving suit for each person on board. (46 C. F. R. 153.12.)

**Accessibility.**—The life suit should always either be worn or placed near at hand. When not worn, it should be kept in the "made ready position"; that is, it should be rolled down over the boots so as to be easily stepped into. The deck crew should wear the suit rolled down to the waist, while on duty. Engine crew should have it near, for instance, in the engine passage or on the boat deck in the "made ready position." If the suit is not worn while sleeping, it should be kept close at hand.

**Knowledge of suit—Inner clothing—Life jacket.**—The kapok jacket approved for use with the particular type of suit carried should be worn at all times when outside inland waters. Clothing for use inside the suit should be as warm as practicable when navigating in winter or in cold latitudes. Each type of approved suit has certain individual characteristics and men should become acquainted with these in order that the suit may serve more effectively.

**Exercise for blood circulation.**—When in the water with the suit, keep arms and legs in motion as much as possible in order to aid blood circulation and keep the air circulating within the

suit. If it is desired to decrease the water pressure on the body, kick the legs up so as to float horizontally. If required to stay in the water for a long period, lift arms high up to aid blood circulation.

**Watertightness at neck.**—The difficulties of making any sort of coverall suit absolutely watertight around the neck are manifold. One of the most effective methods of improving the closure at this point is to wrap a medium-size bath towel or the like around the neck. Such a towel could be loosely fastened into the back of the suit at the neck level. Should the suit become flooded by leakage or perhaps puncture, the kapok life preserver worn with it will maintain the wearer afloat.

**Stowage.**—When not in use, the suit should be stored away from steam pipes, hot locations, or oil and grease.

**Care—Repair kit.**—It should be borne in mind that lifesaving suits are made of rubber and that they may not easily be replaced if damaged, and that they should be taken care of is most obvious. Repair material in the form of a kit similar to that used for repairing automobile inner tubes should be carried on vessels which are provided with lifesaving suits. If the suit is wet, it should not be put away before it is wiped off and, if available, sprinkled with a good grade of talcum powder, which will preserve the rubber.

**Use—Exposure suit.**—The primary value of a lifesaving suit is first, to provide a means of keeping personnel dry if it is necessary to get overboard directly into the water. Keeping the water from wetting clothing and body will keep the body temperature higher and consequently allow the person a longer survival time if he is unable to get on to a raft or into a lifeboat. Second, and an equally important function is the use of the lifesaving suit as an exposure suit on the ship, in the lifeboat or on the raft. Particularly in the colder latitudes and during the winter months every effort should be made to get suits either on the men before they get into the boats or take the suits into the boats or on to the rafts for use there. The value of protection from exposure by the use of lifesaving suits and accessory warm clothing cannot be overestimated.

## WHISTLES AND JACKKNIVES

**Whistles and jackknives.**—On all mechanically propelled vessels of over 1,000 gross tons, each person on board shall be provided with a police whistle and a sailor's jackknife of rugged construction the blade of which shall be about 3 inches in length with a sheep-foot point. Such knives and whistles shall be carried, when practicable, attached to life jackets or lifesaving suits. The handle of the jackknife shall be fitted with a shackle for attaching a lanyard. (46 C. F. R. 153.14.)

**Necessity—Use—Accessibility—Jackknife.**—A sharp jackknife has proved to be a most useful article for all crew members during wartime. The practicability of a knife to a seaman does not have to be explained to the men on deck. Persons of other ratings who do not habitually or by choice carry a knife will, it is hoped, by the provision of the above regulation, realize its value. Knives naturally should be kept sharp in order that they may serve their purpose without delay should their use become necessary to cut lashings or free lines. A lanyard attached to the shackle should be fastened to the person so that even if the knife is dropped, due to cold hands or darkness, it will not be lost.

**Necessity—Use—Accessibility—Whistle.**—Police whistles of substantial plastic material appear to be the best and most practicable sound-producing devices for the individual crew member to carry. Whistles have already proved their value during the present war in locating men in the water during periods of poor visibility during night or day. Both of these articles of equipment should be carried on the person when outside of inland waters.



## LIFE-PRESERVER LIGHT

**Life-preserver light.**—A life-preserver light of an approved type shall be provided for each person which, when actuated, shall show a red light. Such lights are to be attached to the individual life preserver when worn and are to be provided with means for readily transferring light to the lifesaving suit. (46 C. F. R. 153.11.)

**Color—Condition—Use.**—Red light is utilized to distinguish men from rafts and floats which show a white light. Men will not then be swimming towards each other. Life-preserver lights should be worn with preserver at all times when practicable. According to British and Norwegian experience the use of life-preserver lights has probably saved more men's lives than any other individual piece of specialized lifesaving equipment. Be sure you have your light at all times and that it is in good condition.

**Drills—Wearing lights.**—Every member of the crew should show up for drills wearing his life-preserver light attached properly to the life jacket. The light should be worn high so that it will be out of the water when the wearer is afloat in order that the maximum visibility may be obtained.

**Spare lights—Extra batteries.**—In order to provide replacements for damaged or lost lights, it is recommended that spares to the amount of about 10 percent be carried on board. Extra batteries should, of course, be on hand, particularly if a vessel is engaged in long voyages.

## REMOVAL OF CALCIUM WATER LIGHTS

**Removal of calcium water lights.**—All calcium-type self-igniting water lights shall be removed from all ocean and coastwise vessels and shall be replaced with approved electric water lights. (46 C. F. R. 153.22.)

**Calcium type hazardous—Removal.**—Calcium-type water lights have proved to be a hazard during wartime inasmuch as they cause serious fires by igniting oil sprayed on the ship or floating on the water. Therefore, they should be removed as soon as possible even though electric water lights are not available immediately to replace them.

## LUMINOUS MARKING

**Luminous marking.**—All cargo and tank ships of 3,000 gross tons and over and all passenger vessels shall be provided with interior marking in the accommodation, machinery, and working spaces of the vessel in the form of an approved luminous cloth or tape. Such marking shall be sufficient in character to clearly show in darkness the location of exit doors, ports, ladders, companionways, the location of emergency lights, control valves, if necessary, and similar vital locations or accessories. (46 C. F. R. 153.19.)

**Application—Type.**—In order to facilitate the application of luminous tape in the interior of vessels approved tapes are being supplied with a rubber adhesive back. The use of this material in strips of not less than 4 inches in width is recommended in every case, except where the surface to be treated will not take as great a width as 4 inches (such surfaces as control valves, etc.) A strip wider than 4 inches, such as an 8-inch or 12-inch strip, carried along a companionway near the steps will actually give off enough light for a few minutes so that that portion of the steps nearest it can be seen. Some steps have been treated effectively by adhering a 4-inch by 8-inch strip on each riser.

**Locations.**—In selecting locations for tape bear in mind that to be most efficient it must receive light during the daytime, or some artificial light. If one of these locations is approximately equal in value to another the one in which the tape will receive the most reactivation by daylight or artificial illumination should be chosen. The tape, as furnished, is quite moisture-resistant. How-

ever, every effort should be made in marking a vessel to avoid placing it where it will be exposed to drip or excessive condensation. While the above regulation is comprehensive in character to allow general application to all types of vessels, each vessel should be studied and the luminous marking applied in such manner as to give the highest degree of usefulness during an emergency involving a black-out in the ship's lighting system.

**Testing.**—Markings of vessels should be periodically tested by blacking out areas in order that all on board may familiarize themselves with what the luminous material looks like in the dark, as well as directions indicated and exit markings shown.

### EMERGENCY SHIP'S LIGHTS

**Emergency ship's lights.**—On mechanically propelled vessels of 1,000 gross tons or over there shall be provided self-contained, battery-operated emergency lights of an approved type, at least 12 in number, located throughout the vessel in readily accessible locations and plainly marked. These lights shall be portable and shall be readily removable. (46 C. F. R. 153.20.)

**Necessity—Operation.**—When a ship is torpedoed or strikes a mine it often happens that the lights immediately go out. In such cases light is immediately necessary to enable personnel to take effective measures to carry on with the work of attempting to save the ship or abandon it. While some types of lights have been approved after showing their suitability for rugged work, there is available an approved type of light, which through a simple but certain mechanism, assures that it will operate immediately upon the failure of a ship's current. Lights of this type distributed about the ship and plugged into the lighting circuits provide a fairly positive means of emergency lighting without further dependence upon personnel to locate and operate lights. The fact that the lights are quickly in operation, at such a time, actually provides a light for personnel to reach their locations, remove them, and utilize them as is necessary.

### EMERGENCY FLASHLIGHTS

**Emergency flashlights.**—There shall be provided for each licensed officer an approved flashlight of the three-cell type suitable for signaling. (46 C. F. R. 153.13.)

**Construction—Accessibility.**—Flashlights suitable for emergency use in wartime should be as nearly watertight as possible and at least splashproof, as it may be found necessary to utilize the flashlight for signaling purposes after getting into the water under conditions where the flashlight may be periodically submerged. The button of the switch should be of such construction that signaling may be carried on easily without having to slide the switch back and forth. Officers should keep their flashlights handy during the nighttime and should be prepared to take them along with them at any time that it should become necessary to abandon ship, night or day.

**Caps for lens.**—For use during black-out, caps for flashlights may be fabricated from metal or cardboard in order to provide a small round light beam about one quarter inch in diameter. Alternatively the glass may be painted over, leaving a slit or small round clear area.

### EMERGENCY ESCAPE LADDERS—ENGINEERING SPACES

**Emergency escape ladders.**—On mechanically propelled vessels of over 1,000 gross tons at least two wire or chain ladders (one on each side) leading directly to the highest part of the engine room casing shall be provided and arranged in a way most likely to allow the escape of engine room personnel in the event of damage to the fixed ladders and gratings. On steam vessels a similar ladder shall be provided in the fire room running through the ventilator, if practicable. Such ladders are not to be hauled taut. They are to be lashed loosely at the floor plates. (46 C. F. R. 153.21.)



**Arrangement.**—In many cases fixed ladders and gratings are torn loose to such a degree that their use as a means of escape from the engine or fire room is impossible. For this reason the above ladders constructed of wire rope or chain are provided. They are purposely left slack to allow enough give so that the concussion will not snap them. Where ladders lead to the engine room skylight and come up under the screen provided for antisabotage purposes, a portion of the screen in the form of a hatchway or other section should be provided as removable from below. The location and arrangement of such ladders should be given careful thought in order that they may most effectually serve their purpose should the need arise. Ladders fitted in ventilators in the fire room may necessitate similar attention to the screen in or near the cowl in order to make it removable for any person coming up from below. Engine- and fire-room personnel well know the danger which exists from escaping steam, should it be present in quantity in the upper part of the machinery space or boiler room. Should it become apparent that escape is not feasible by the use of ladders it should be borne in mind that the shaft alley offers the best alternative.

### MAIN ENGINE AND PUMPS—REMOTE CONTROL

**Main engine and pumps, remote control.**—All mechanically propelled vessels are to be provided with a remote-control arrangement for promptly stopping the engines. In the case of reciprocating engines and steam turbines this is to be accomplished either by fitting a remote throttle control or by providing prompt and efficient means of simultaneously shutting the stop valve of each main boiler. On Diesel vessels a shut-off on the fuel line at the engine is to be utilized. These controls are to be located on the upper deck, preferably on the boat deck and in such position that they may be readily operated in an emergency.

On vessels propelled by steam turbines a vacuum breaker, which can be operated from the remote control position, shall be provided in order to stop the turbines promptly.

Pumps, particularly main circulating pumps, which discharge above the light load line, are to be fitted with remote control valves for shutting them down. These controls are to be located adjacent to the remote control for the main engine. (46 C. F. R. 152.3.)

**Necessity.**—As has previously been stated in other emergency regulations the importance of taking the way off the ship before lifeboats are placed in the water cannot be too strongly emphasized. To the failure to do this can be attributed the loss of many seamen's lives during World War I and during the present conflict. While it is realized that engines will roll over due to momentum and the action of the water on the propeller, if the power is cut off, the suction under the quarter is reduced and the ship gradually slowed.

**Arrangement—Operation.**—This remote-control arrangement in conjunction with the vacuum breaker on turbine installations is provided in order that it may be utilized when it is no longer possible to remain in the engine room and control propulsion machinery. In many cases during the present conflict it has been found possible to reverse the engines for a short period of time in order to reduce the speed of the ship sufficiently to enable the boats to be lowered with a reasonable degree of safety. A prearranged system of signals between the engine room and the bridge should be worked out. Such system would undoubtedly have to be some sort of manually operated klaxon or some other device or readily discernible method of notification of the type of action to be taken. In many cases review of war casualties has indicated that the telegraph and other communication is cut off by the explosion of a torpedo. If remote-control arrangements are installed they should be tried at the first opportunity when the vessel is in a safe location in inland waters in order to determine how well they function and the length of time necessary for the ship to slow to a safe speed, assuming the engine room is untenable for the operation of the engine. The remote controls to main engine and pump should also be tested at frequent intervals to make sure they are in proper working condition at all times.

**Condenser vacuum undesirable.**—Any sort of arrangement which depends upon the vacuum of the condenser for closing a piston-type stop valve on each boiler does not appear to be desirable since should the condenser be damaged or the vacuum otherwise lost, no means of shutting down the stop valves by the remote-control arrangement remains. In such case the fracture of steam lines beyond the stop valves would release live steam to flood the engine space and perhaps the fire room and no method of shutting it off would be available which was accessible.

**Overboard discharges.**—Main circulating pumps and other overboard discharges which eject a substantial stream above the light load lines are most hazardous in connection with safely getting boats on the water and away from the ship. While some streams may not be large enough to fill boats rapidly, the added confusion due to water pouring over the boat's crew and other personnel, as the boats drift astern, is extremely undesirable. Furthermore, in cold weather, getting the outside clothing wet in a lifeboat will almost inevitably cause death from exposure.

**Alternative arrangements.**—If on certain smaller pumps it does not seem feasible or practicable to provide extensions to shut down from the top side, some other method should be adopted to prevent the water from being discharged in a solid stream away from the vessel's side. Covering boxes permanently lashed to an eyebolt welded below the hole and held in place by a line to the rail can in some cases be utilized.

### DEGAUSSING

**Degaussing.**—Every vessel of 2,000 gross tons or over shall be degaussed in accordance with the requirements of, and at such time as may be fixed by, the War Shipping Administration. (46 C. F. R. 152.2.)



## SPECIAL PROVISIONS

### SECURITY INSPECTION

***Security inspection.***—The master is responsible for the proper performance and condition of all lifesaving and other safety equipment and in this connection he shall designate an officer or other person whose duty it shall be to inspect the vessel daily to determine that all such equipment is in good order and ready for immediate use. He shall report the findings of his daily inspection to the master who shall, if any deficiencies or other undesirable conditions are reported, take such action and issue such orders as may be necessary to place the equipment in proper condition, insofar as is practicable. (46 C. F. R. 153.26.)

***Thoroughness of inspection.***—In order to carry out most properly the spirit and intent of the above regulation requiring a daily security inspection at sea, every effort should be made to avoid conducting such inspections in a perfunctory manner. In the interest of safety there is no reason why the master should not designate different persons on different days to conduct the inspection. Some questions may arise in connection with the arrangement or location of equipment which may be matters of opinion. In all such cases serious thought should be given to any alternative arrangements which may be proposed. In connection with the location, arrangement, and maintenance of life-saving equipment, as well as all other safety features of the vessel, the attitude of the officers should be such as to inspire the crew with the feeling that a sincere effort is being made to provide the highest standard of safety possible.

### BLACK-OUT ENFORCEMENT

***Black-out enforcement.***—The master shall, when the vessel is at sea, maintain a complete black-out of his vessel from dusk until dawn except for the display of running lights in such areas and under such conditions as may be directed by competent naval authority. (46 C. F. R. 153.19.)

***Light—black-out.***—The strict enforcement of this regulation, except when under direct instructions from a naval escorting vessel, is most necessary. On ships which carry persons in addition to crew, such persons should, upon leaving port, be called together and most seriously cautioned concerning the use of lights on deck or in any other location which might be visible to enemy vessels. Smoking on deck or lighting matches should not be permitted. The faintest glimmer of light is visible for a good distance by watch officers of enemy vessels. Fidley doors should be given particular attention as reflected light from the furnaces when the doors are open is often visible above the upper grating. Exhaust Venturi-type ventilators on houses also offend in allowing light to be reflected through, and should be screened or blocked off. Until the master is completely satisfied that his vessel is completely darkened and does not show a glimmer of light, he should make a daily inspection at sunset or shortly after dark to determine the condition of the arrangements, light locks, switches, blue lights, etc. When in convoy, daytime signaling should be utilized to advise vessels in company of any glimmer or glow of light of the slightest nature which was observed during the previous night.

***Noise—black-out.***—It should be borne in mind, also that a black-out of light necessarily calls for a black-out of noise of all but that of an unavoidable nature. Striking bells in the engine room on large gongs, the popping off of safety valves, or even the striking of time on the bridge may be heard a long way on a quiet night down the wind. The blowing down of the boilers should be avoided during the nighttime.

**Black-out arrangements.**—Headquarters is prepared to furnish details concerning black-out arrangements, door switches, arrangement of light locks, types of blue light, etc., upon application by owners or operators.

## SEA CONNECTIONS TO SIDES OF VESSELS BELOW THE FREEBOARD DECK

**Connections to sides of vessels below the freeboard deck.**—Discharges led through the vessel's sides from spaces below the freeboard deck are to be fitted with sufficient and accessible means for preventing water from passing inboard. Each separate discharge may have an automatic nonreturn valve with a positive means of closing it from a position above the freeboard deck, or two automatic nonreturn valves without positive means of closing, provided the upper valve is situated so that it is always accessible for examination under service conditions. The positive-action valve is to be readily accessible and is to be provided with means for showing whether the valve is open or closed.

Conditional upon the type and the location of the inboard ends of such openings, similar provisions may be prescribed by the assigning authority as to discharge from spaces within inclosed superstructures.

Where scuppers are fitted in superstructures not fitted with class 1 closing appliances they are to have efficient means for preventing the accidental admission of water below the freeboard deck.

On vessels whose keels are laid on or after June 15, 1941, cast iron is not to be used for any connection to the vessel's sides if located below the freeboard deck, nor are cast-iron valves to be secured to sea chests.

Vessels constructed with cast-iron valves and cast-iron sea chests, where it is not practicable to replace the cast iron with more ductile material, reinforcing with concrete or other approved material in conjunction with structural bracing will be fitted in a manner satisfactory to the Commandant, U. S. Coast Guard. (46 C. F. R. 43.27.)

**Insufficiency of cast-iron sea connections.**—It has been found that the watertight integrity of ships may be seriously impaired by a bomb or mine which explodes in close proximity to the ship's hull. The resulting concussion in the water will fracture cast-iron fittings on the sea connections, such as sea chests and accessory valves, bilge and ballast sea connections, and other cast-iron fittings on the ship's hull below the limit line defined hereinafter.

**Reinforcement of cast-iron fittings.**—In order more properly to protect American vessels against such damage, an amendment to 46 C. F. R. 43.27 of the Load Line Regulations requires, where practicable, that all vessels to which such regulations are applicable (i. e., vessels of over 150 gross tons engaged in foreign and coastwise voyages) be required to provide reinforcement in the way of all cast-iron fittings provided as sea connections. In carrying out the provisions of this amendment, it is expected that each vessel will be surveyed with a view to protecting her, insofar as is possible, from any loss of watertight integrity due to the concussion caused by bomb, mine, etc.

**Replacement of cast-iron fittings.**—There are set forth herein certain specifications which can be used as a guide in carrying out this work. Alternative methods such as enclosing valves in light metal casings welded to the ship's hull to form a watertight box and fitted with a stuffing box for the operation of the valve may be utilized, if necessary. It may, of course, be possible in certain cases to replace cast-iron fittings with other fittings which are more ductile and not subject to damage. In such cases no additional reinforcement will be necessary.

**Valve extensions.**—Where the handwheels of shipside valves are liable to be submerged at an early stage by flooding from a fractured inboard pipe or connection, arrangements should be made to provide gear for closing such valves from a higher level.

**Sea connections—protection.**—All sea connections which fasten to the shell and are located below a line extended forward and aft from a point about 1 foot above (to allow for list) the tropical



fresh-water mark (with allowance for trim by head or stern) are liable to damage by concussion. All connections below this line should have protection; any connection above this line that is 6 inches in diameter, or the equivalent, should also be protected.

**Straps.**—It is the intent that the entire sea chest, valve, and pipe adjacent to the valve be secured to the shell by means of steel straps sufficient to resist any tendency of the valve, etc., to move in any direction relative to the shell. Straps must be tight.

**Concrete—welding.**—After the straps are installed, the unit shall be imbedded in concrete to the flange of the bonnet. The bonnet is to be left free to permit overhaul and inspection of the valve. The mass of concrete shall be reinforced throughout with  $\frac{1}{2}$ -inch-diameter steel reinforcement rods spaced approximately on 6-inch centers and run in three directions; i. e., perpendicular to shell, fore and aft, and thwartships. All rods shall be welded to the shell, frames, floors, etc., which they intersect. Free ends of all rods shall be hooked. After the concrete sets, suitable beams, channels, plates, etc., shall be attached on top and inboard sides of concrete mass held down firmly with initial pressure. This shall be accomplished by means of bolts imbedded in the concrete, welded to shell, or by other suitable means.

**Purpose of concrete.**—In determining the amount of concrete to be used, the conditions on the ship will necessarily govern. The purpose of the concrete is, first, to absorb shock of the explosion; second, to prevent the disintegration of the cast iron; and third, if the cast iron cracks, to hold the pieces in position.

**Thickness of concrete.**—In general, the concrete should be not less than 9 inches thick. Where connections are located between floors or brackets, the concrete should extend between floor or bracket. Where the connection is located so close to substantial structure as to prohibit 9 inches of concrete, less thickness may be permitted if, in sound engineering judgment, the concrete protection will be effective.

**Mixture of concrete.**—The concrete mixture shall be composed of one part portland cement and two parts sand, thoroughly mixed with the minimum amount of water practicable. Concrete shall be chipped away clear of bonnet flanges so as to render possible their easy removal.

## REMOVAL OF SHIP'S IDENTIFICATION MARKS

**Removal of vessel's name and home port.**—Vessels of 1,000 gross tons and over operating in coastal, intercoastal, or foreign trade are to have all exterior ship's identification and distinguishing marks removed, including the painting out of the name and hailing port. Portable name boards may be utilized when entering and departing from port as may be required.

To effectuate this intent and purpose any part of the general rules and regulations contrary thereto are hereby suspended for the period of the national emergency. (46 C. F. R. 153.8.)

## CARGO

### LOADING—STOWAGE—INSPECTION

**Cargo: Loading, stowage, and inspection.**—If at any time prior to or after completion of the loading of any vessel in a United States port, the master shall deem that she is unseaworthy due to the stowage or nature of the cargo or both, he shall immediately so inform the district office. An immediate examination of the vessel shall be made and, if necessary, the certificate of inspection shall be withdrawn until such time as the conditions found are satisfactorily corrected. (46 C. F. R. 153.27.)

**Importance of Proper Loading and Stowage—Enforcement.**—Wartime cargoes consisting of much miscellaneous heavy military equipment, airplanes, and explosives, loaded under conditions which sometimes make detailed supervision most difficult, may render a vessel unseaworthy under certain conditions of loading. It is most strongly recommended that the ship's cargo officer receive the cooperation of the agents and stevedores in working out a stowage plan for the vessel's consignment of cargo. Particular attention should be paid to heavy deck cargo which sometimes, when combined with light, bulky materials stowed below, may seriously impair the ship's stability during the latter half of the voyage. Loading extremely heavy cargo in the ends of the ship will, it is quite evident, cause a more serious hogging strain. Heavy deck cargo may materially contribute to this condition. Shoring of heavy cargo, whether stowed in 'tween decks or on deck, should be carefully attended to. Valuable deck cargo has in certain cases on northern routes shifted due to improper securing, and materially contributed to the unseaworthiness and lack of maneuverability of the vessel. Masters should instruct their cargo officers that they are to be watchful during loading to prevent *at the time* any cargo being loaded and stowed in a manner which may endanger the ship on the voyage which she is about to undertake. Cargo officers should be reminded that should difficulties arise which necessitate action the district Coast Guard office should be immediately informed by telephone in order that officers may be detailed to assist the ship's officer in securing compliance with his request.



## ALL SEAGOING BARGES (NON-SELF-PROPELLED VESSELS)

### APPLICABILITY OF EMERGENCY REGULATIONS

**Applicability of emergency regulations.**—The provisions of subchapter O apply in all cases to seagoing barges unless they are specifically exempted. For example, in the case of the two life floats required by section 153.25, the regulation specifically mentions “mechanically propelled vessels.” This requirement does not, therefore, apply. On the other hand, the requirement that life-preserver lights be provided for “each person on board” does apply to seagoing barges. The Code of Federal Regulations requires the following equipment on lifeboats and life rafts on seagoing barges:

**Lifeboat equipment.**—Lifeboats on seagoing barges of 100 gross tons and over shall be equipped as follows:

#### Lifeboats:

Boathooks.....	2.
Bucket.....	1.
Distress signals.....	12.
Drinking cups.....	2, One to be graduated in ½-ounce sections.
Grab rails.....	1 on each side.
Lantern.....	Lantern containing sufficient oil to burn at least 9 hours.
Life line.....	1.
Life preservers.....	2.
Matches.....	3 boxes of friction matches in watertight case.
Oars.....	4 and one steering oar.
Painter.....	1.
Plugs.....	2.
Provisions.....	For number of persons to be accommodated.
Rowlocks.....	4.
Sea anchor.....	1.
Signaling mirrors.....	2.
Signal flag.....	1.
Storm oil.....	1 gallon.
Spray hood and curtain.....	1.
Drinking water.....	10 quarts for each person boat is to carry.

#### Life-raft equipment.—

##### Life rafts:

Distress signals.....	12.
Drinking cups.....	2.
Lantern or flashlight.....	Lantern containing sufficient oil to burn at least 9 hours.
Life line.....	1.
Matches.....	1 box of friction matches in watertight case.
Provisions.....	For number of persons to be accommodated.
Oars.....	4.
Painter.....	1.
Rowlocks.....	5.
Signal flag.....	1.
Sea anchor.....	1.
Storm oil.....	1 gallon.
Drinking water.....	3 quarts for each person raft is to carry.
Signaling mirrors.....	2.

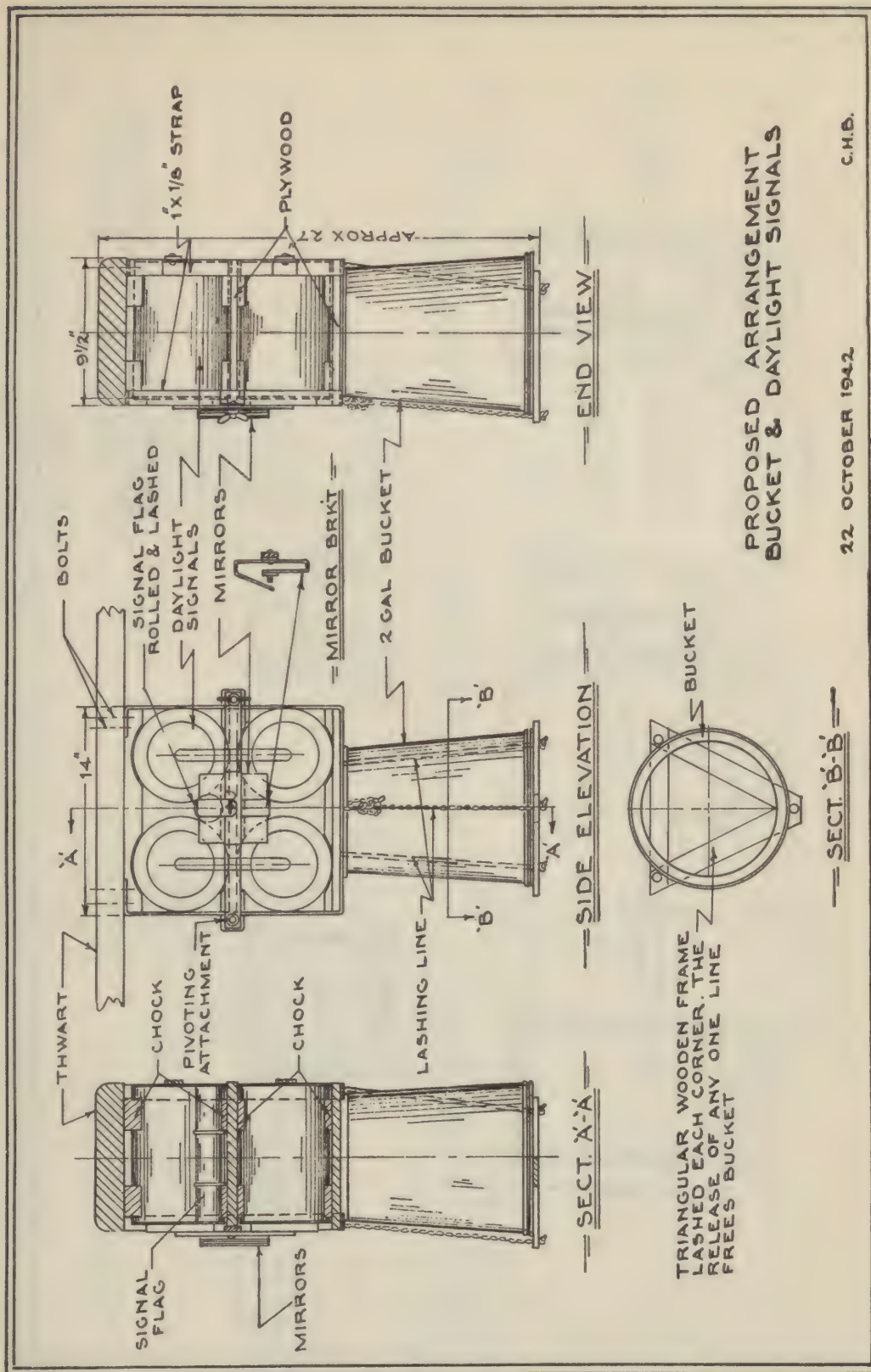


Figure 16A.—Stowage arrangement for bucket and daylight signals.



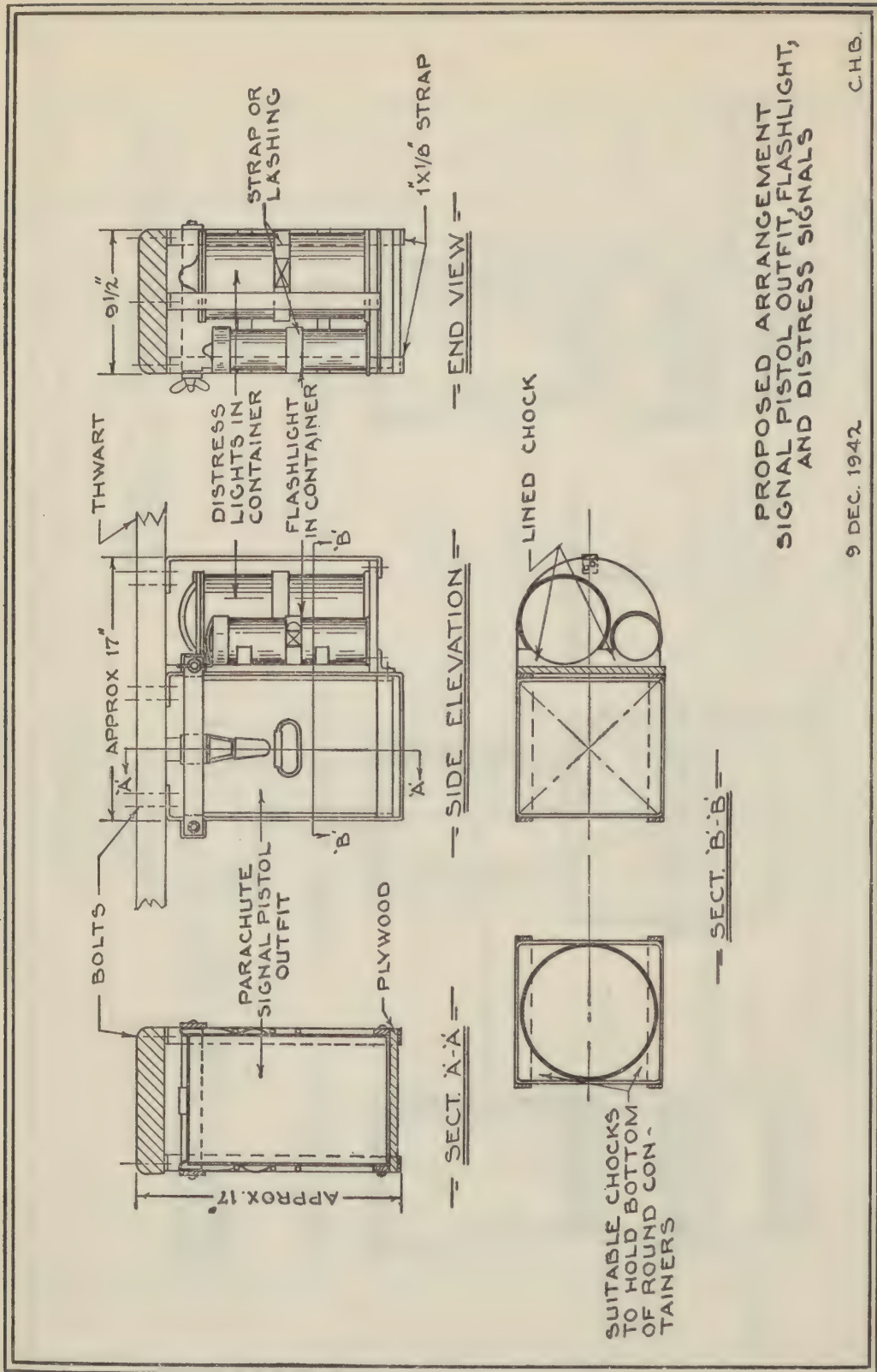


Figure 16B.—Stowage of signal pistol outfit, flashlight, and distress signals.

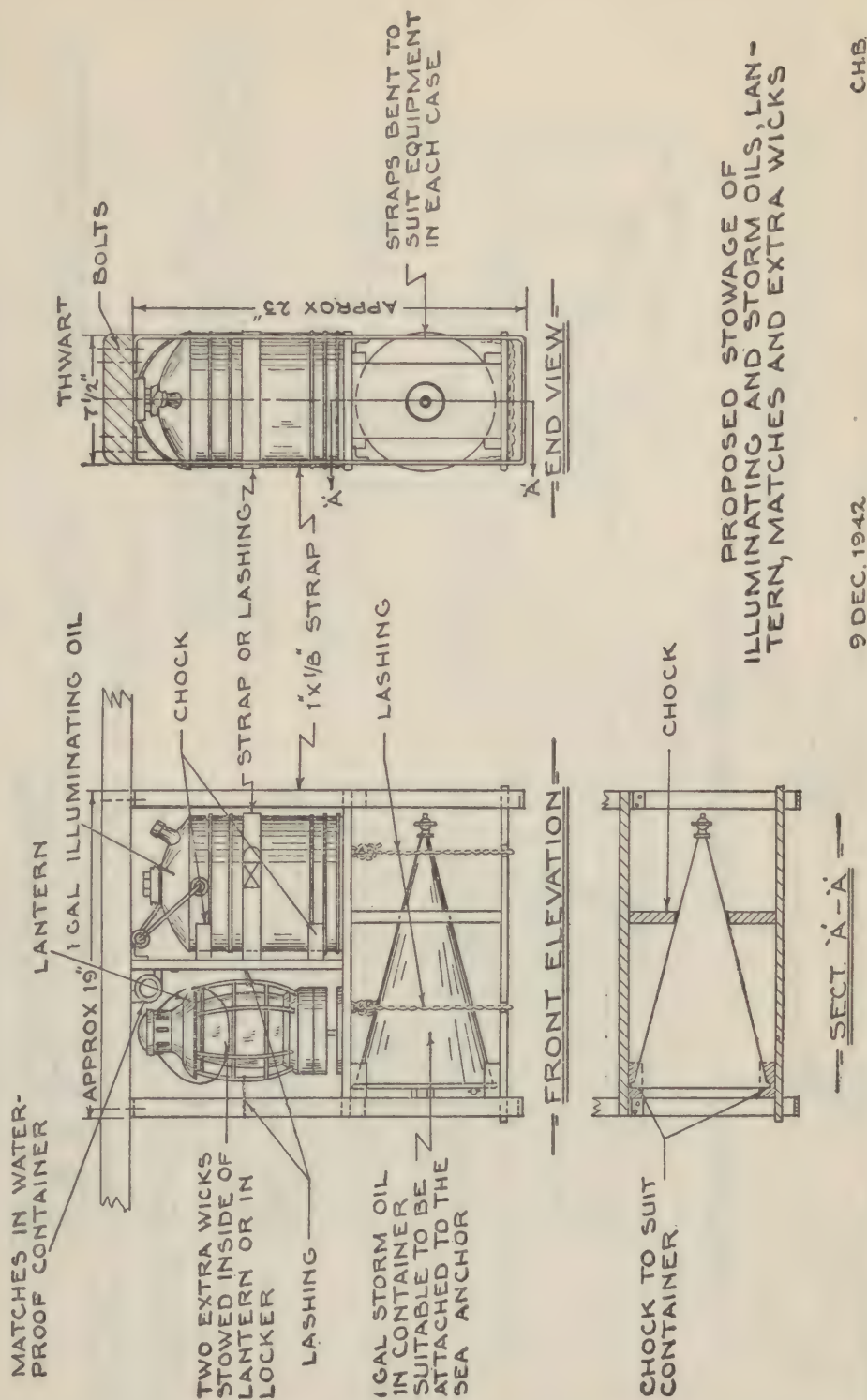


FIGURE 16C.—Stowage of illuminating and storm oils, lantern, matches, and extra wicks.



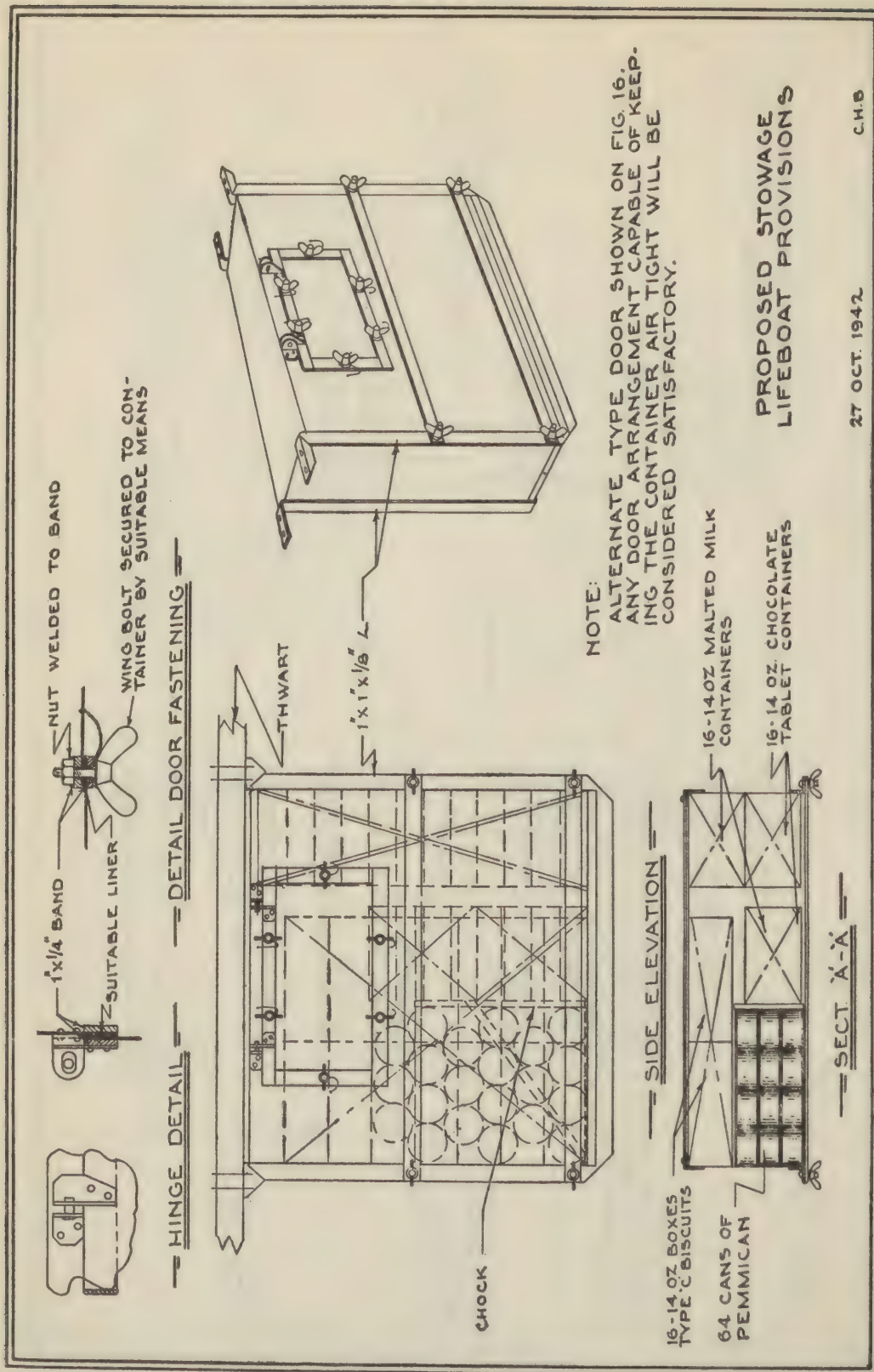
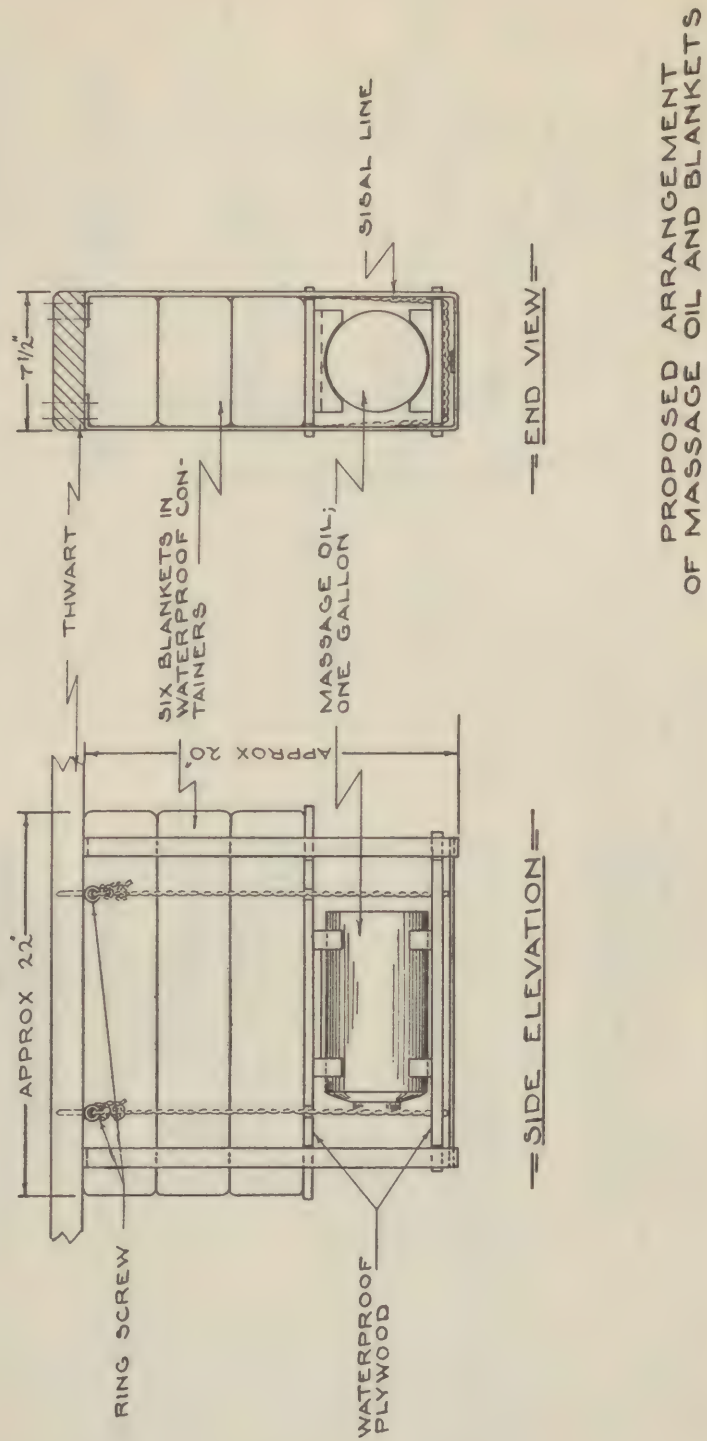


Figure 16D.—Stowage arrangement for lifeboat provisions.



PROPOSED ARRANGEMENT  
OF MESSAGE OIL AND BLANKETS

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Figure 16E.—Stowage arrangement for message oil and blankets.



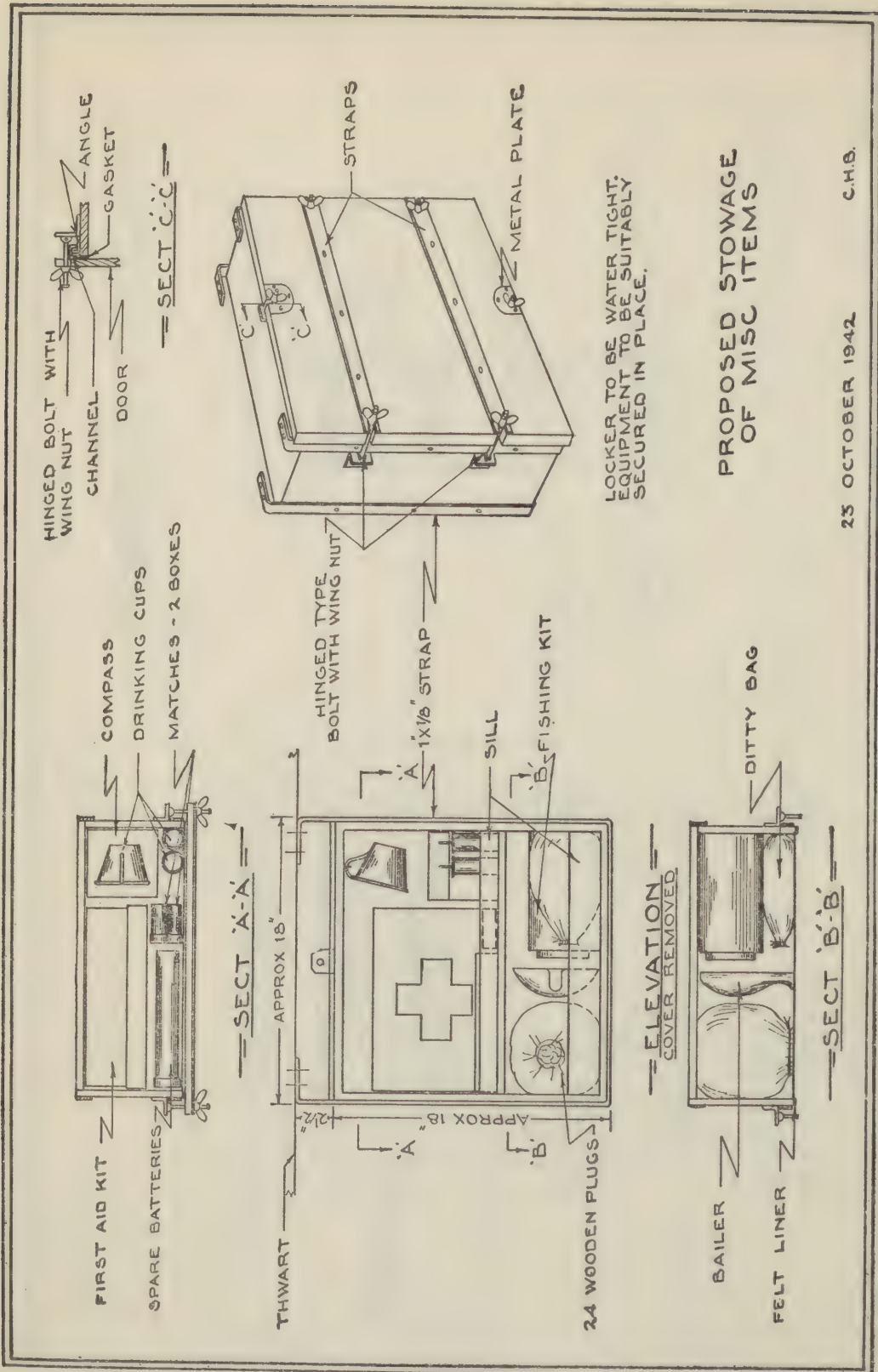
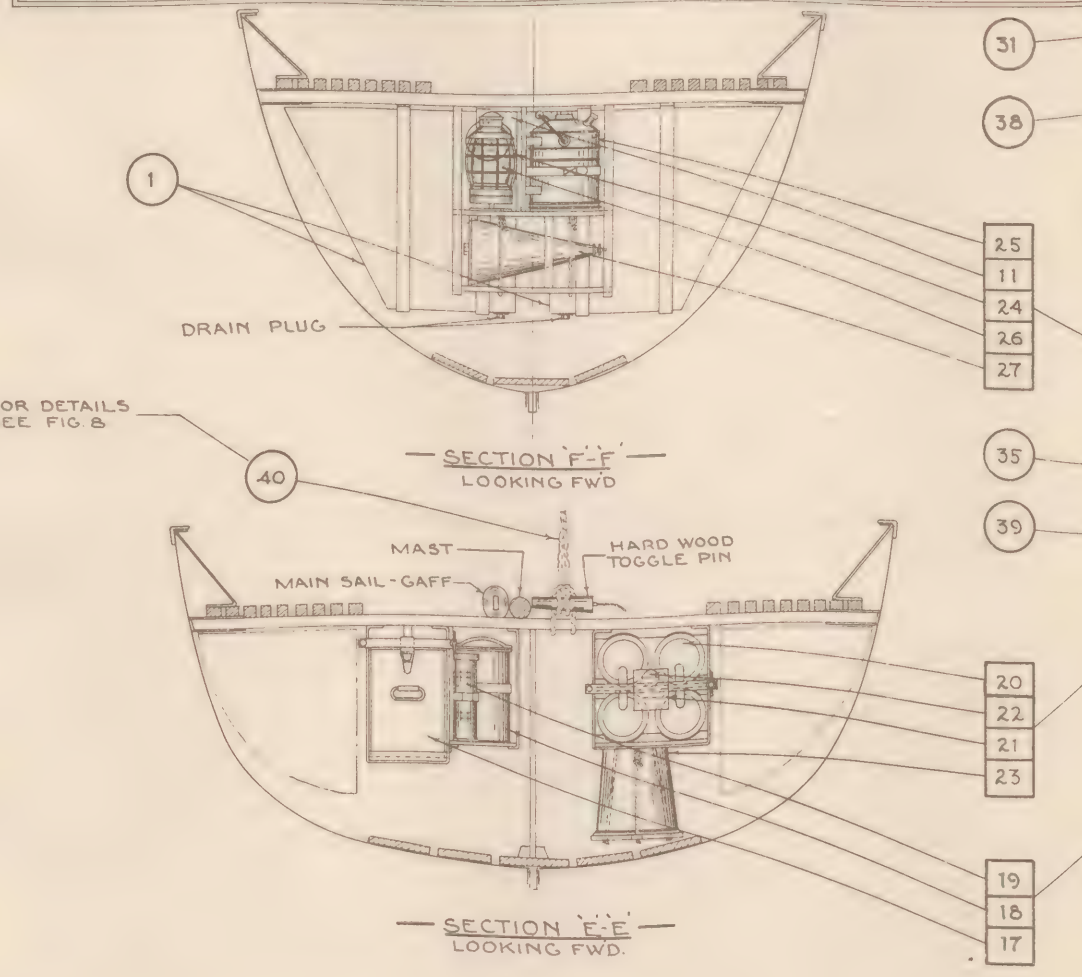


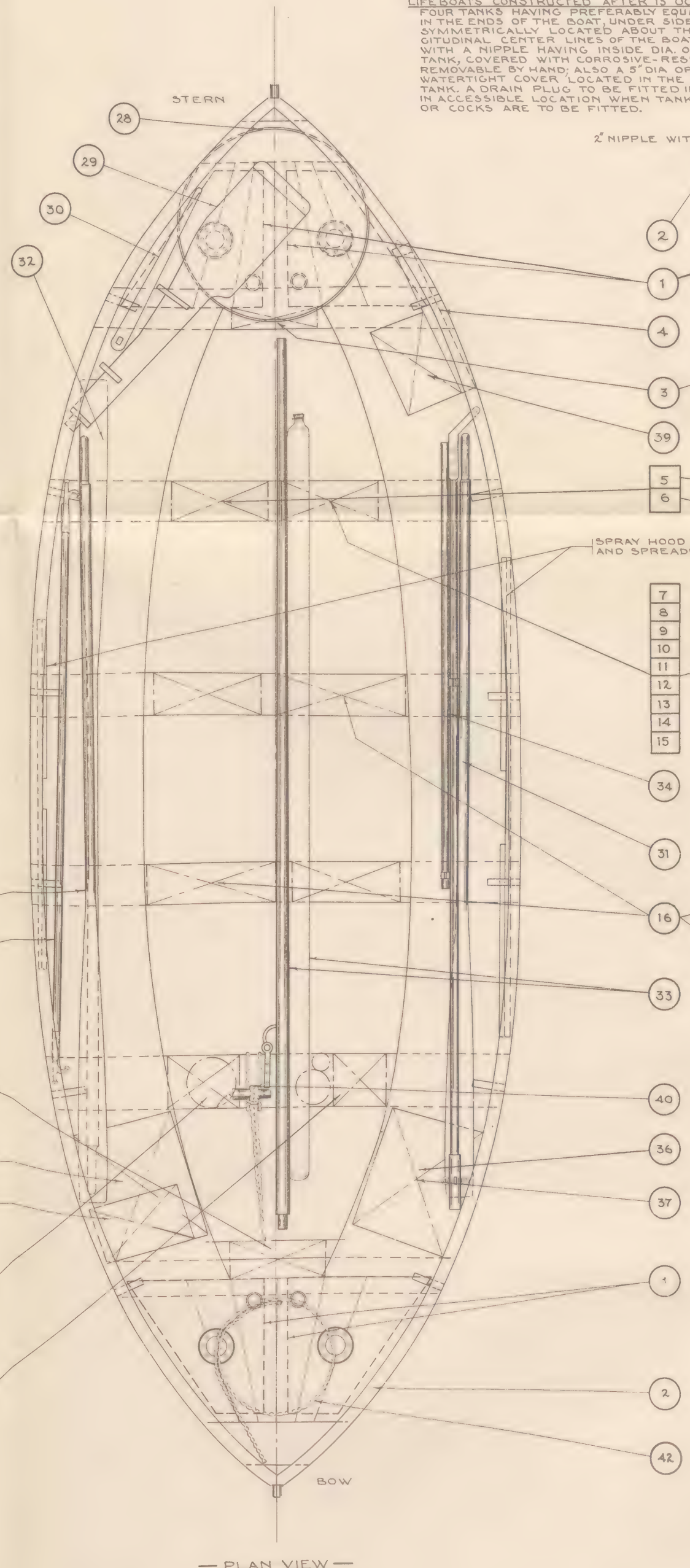
Figure 16F.—Stowage of miscellaneous items.



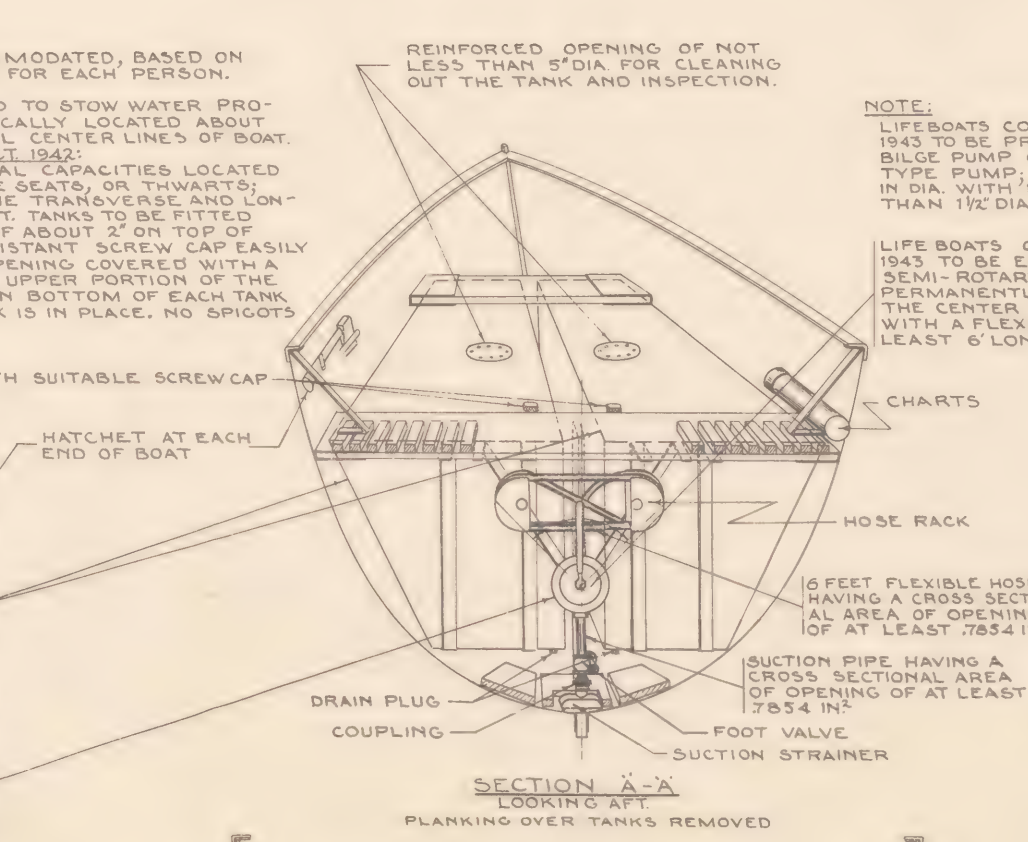
EQUIPMENT REQUIRED IN LIFEBOATS OCEAN AND COASTWISE SERVICE			
PARTS 59 AND 60 SUBCHAPTER G, AND 153 OF SUBCHAPTER O, TITLE 46 CFR IN EFFECT 10 DEC 42			
NO.	ITEM OF EQUIPMENT	STOWAGE	REMARKS
1	FRESH WATER TANKS	SEE NOTE	10 QTS. OF WATER PER PERSON
2	HATCHETS, SINGLE EDGE	ONE IN EACH END	ATTACHED BY LANYARD
3	BILGE PUMP	WELL DOWN IN	SEE NOTE
4	CHARTS - AS REQD.	SIDE BENCH	WATERTIGHT METAL CASE
5	WOOLEN BLANKETS	UNDER THWART	6 IN. WATER PROOF COVERS
6	MASSAGE OIL, 1 GAL.	"	SUITABLE MASSAGE FEET-LEGS
7	FIRST AID KIT, UNIT TYPE	LOCKER UNDER THWART	WATERTIGHT METAL CASE
8	DRINKING CUPS, 3 REQD.	"	2 MARKED IN 1/2 OZ. SECTIONS
9	COMPASS, LIQUID TYPE	"	AT LEAST 2" CARD
10	FLASHLIGHT BATTERIES, 3	"	APPROVED TYPE; 3 CELL
11	MATCHES, FRICTION	"	3 BOXES WATERTIGHT CASES
12	DITTY BAG	"	PALM, NEEDLES, TWINE, MARLINE, SPIKE
13	BAILER, SUITABLE SIZE	"	LANYARD ATTACHED
14	WOODEN PLUGS, 25 REQD.	"	3" LONG, TAPERED 1/4 TO 3/4 DIA.
15	FISHING KIT	"	SEE REGULATIONS
16	PROVISIONS - AS REQD.	UNDER THWART	SEE NOTE
17	SIGNAL PISTOL OUTFIT	UNDER MAST THWART	APPROVED TYPE - WT. CONTAINER
18	DISTRESS SIGNALS, 12	"	APPROVED TYPE - WT. CONTAINER
19	FLASHLIGHT, 3 CELL TYPE	"	4 REQD., APPROVED TYPE
20	DAYTIME DISTRESS SIGNALS	"	METALLIC - 20 SQ. IN. SURFACE, MIN.
21	SIGNALING MIRRORS, 2	"	YELLOW OR BRIGHT ORANGE
22	SIGNAL FLAG 4-6 X 8	"	GALV. IRON - LANYARD ATTACHED
23	BUCKET, 2 GAL. CAP.	"	CAPABLE BURNING 9 HRS.
24	LANTERN	UNDER THWART	IN METAL CONTAINER
25	ILLUMINATING OIL, 1 GAL.	"	IN WATERPROOF CONTAINER
26	LAMP WICKS, 2	"	SUITABLE METALLIC CONTAINER
27	STORM OIL, 1 GAL.	"	36 DIA. MOUTH, 5" LONG, 1/2" CANVAS
28	SEA ANCHOR	TOP AFTER SEAT	STRAIGHT GRAINED OAK OR FIR
29	RUDDER	"	SUITABLE
30	TILLER	"	"
31	OARS, ROWING AS REQD.	SIDE SEATS, TOP	SINGLE BANKED COMP. 2 SPARE, WITH ROWLOCK OR BECKET
32	OAR STEERING, 1	"	SAIL, RED OR CHROME COLOR, PROTECTED BY SUITABLE CANVAS COVER, PROPER GEAR TO BE PROVIDED
33	MAST AND SAIL	TOP OF THWARTS NEAR	ACCOMMODATE RADIO ANTENNA
34	TOP MAST	SIDE SEAT, TOP	1/2" YELLOW WATERPROOFED DUCK, EXTEND FROM BOW TO MAST OR APPROX. 1/3 LENGTH OF BOAT, EASY TO RIG
35	CANVAS HOOD	"	1/2" YELLOW WATERPROOFED DUCK, EXTEND FROM AFT END OF HOOD TO AFT THWART, MIN. WIDTH OF 12"
36	SIDE SPRAY CURTAINS	"	RED OR CHROME COLOR
37	JIB SAIL	"	ASH, NOT LESS 8' LONG AND 1 1/2" DIA.
38	BOAT HOOKS, 2	"	APPROVED TYPE
39	LIFE PRESERVERS, 2	"	NOT LESS THAN 2 3/4" CIR; LENGTH NOT LESS THAN 3 TIMES DIST. BETWEEN BOAT DK. AND LIGHT DRAFT SEE FIG. 8
40	PAINTER, SEA	TOP FORWARD SEAT	ONE SET AND A HALF OF THOLE PINS OR ROWLOCKS.
41	OAR LOCKS, AS REQD.	ATTACHED AT ROWLOCK	15 FATHOMS NOT LESS THAN 2 3/4" CIR. ATTACHED TO STEM.
42	PAINTER, ADDITIONAL	FITTINGS WITH SEPARATE CHAINS	FESTOONED 3' RIGHTS - SEINE FLOATS
43	LIFE LINE	COILED ON FWD END SEAT	2 CAPS ATTACHED BY CHAINS
44	AUTOMATIC PLUGS	ATTACHED TO SIDES OF BOAT	30 FATHOMS 15 THREAD MANILA
45	LINE	ATTACHED IN PLACE	FOR DETAILED REQUIREMENTS REFER TO APPLICABLE REGULATIONS.



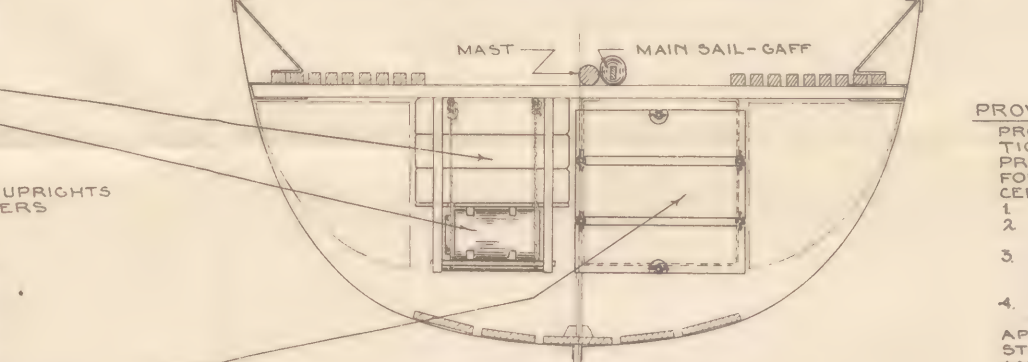
GENERAL NOTES:  
1. OARS, BOAT HOOKS, MAST, SAIL, LIFE PRESERVERS, RUDDER AND TILLER TO BE LIGHTLY LASHED TO FACILITATE THEIR IMMEDIATE USE.  
2. HOOD, SIDE CURTAINS AND JIB SAIL MAY BE FOLDED FLAT, OR ROLLED AND LIGHTLY LASHED TO SIDE BENCH.



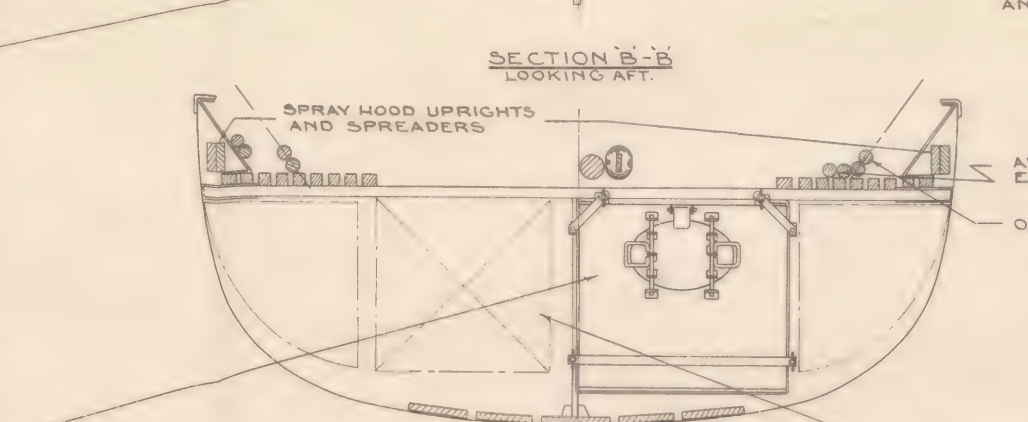
**FRESH WATER TANKS**  
ALL LIFEBOATS:  
CAPACITY 10 QTS. PER PERSON ACCOMMODATED, BASED ON 1/10 THE CUBIC VOLUME OF THE BOAT FOR EACH PERSON.  
EXISTING LIFEBOATS:  
CONVERTED AIR TANKS MAY BE USED TO STOW WATER PROVIDED TANKS USED ARE SYMMETRICALLY LOCATED ABOUT THE TRANSVERSE AND LONGITUDINAL CENTER LINES OF BOAT.  
LIFEBOATS CONSTRUCTED AFTER 15 OCT. 1942:  
FOUR TANKS HAVING PREFERABLY EQUAL CAPACITIES LOCATED IN THE ENDS OF THE BOAT, UNDER SIDE SEATS, OR THWARTS; SYMMETRICALLY LOCATED ABOUT THE TRANSVERSE AND LONGITUDINAL CENTER LINES OF THE BOAT. TANKS TO BE FITTED WITH A NIPPLE HAVING INSIDE DIA. OF ABOUT 2" ON TOP OF TANK, COVERED WITH CORROSION-RESISTANT SCREW CAP EASILY REMOVABLE BY HAND, ALSO A 5" DIA. OPENING COVERED WITH A WATERTIGHT COVER LOCATED IN THE UPPER PORTION OF THE TANK. A DRAIN PLUG TO BE FITTED IN BOTTOM OF EACH TANK IN ACCESSIBLE LOCATION WHEN TANK IS IN PLACE. NO SPIGOTS OR COCKS ARE TO BE FITTED.



**NOTE:**  
LIFEBOATS CONSTRUCTED PRIOR TO 1 JAN. 1943 TO BE PROVIDED WITH SEMI-ROTARY BILGE PUMP OR GOOD QUALITY BARREL TYPE PUMP; BARREL TO BE AT LEAST 2" IN DIA. WITH DISCHARGE HOSE NOT LESS THAN 1 1/2" DIA. AND 6' LONG.  
LIFEBOATS CONSTRUCTED AFTER 1 JAN. 1943 TO BE EQUIPPED WITH APPROVED SEMI-ROTARY OR EQUALLY SUITABLE PUMP PERMANENTLY INSTALLED WELL DOWN IN THE CENTER LINE OF THE BOAT AND FITTED WITH A FLEXIBLE DISCHARGE HOSE AT LEAST 6' LONG.



**PROVISIONS:**  
PROVISIONS TO BE STOWED IN AIR-TIGHT CONTAINERS. THE FOLLOWING PROVISIONS SHALL BE PROVIDED FOR EACH PERSON THE LIFEBOAT IS CERTIFICATED TO CARRY:  
1. 14 OZ. TYPE C BISCUIT, U.S. ARMY SPEC.  
2. 14 OZ. PEMMICON, U.S. NAVY AIRCRAFT EMERGENCY RATION  
3. 14 OZ. OF CHOCOLATE TABLETS OR ADDITIONAL 14 OZ. OF TYPE C BISCUIT (ITEM 1); WATERPROOF PACKAGE  
4. 14 OZ. MILK TABLETS IN WATER-PROOF PACKAGE.  
APPROVED EQUIVALENTS MAY BE SUBSTITUTED FOR EITHER OF ITEMS 2 AND 4 OR BOTH.



SPACE MAY BE UTILIZED FOR STORAGE OF WATER IF NECESSARY OR FOR STOWAGE OF THE EMERGENCY RADIO AND ABANDON SHIP KIT.

U.S. COAST GUARD  
MERCHANT MARINE INSPECTION  
**EFFICIENT METHOD OF STOWING EQUIPMENT  
IN CLASS 1A OAR PROPELLED LIFEBOAT**  
**FIG. 16**  
DECEMBER 7, 1942



## HINTS

**Attitude in boats.**—Men in boats should remember that their chance of survival depends primarily on their mental attitude and cooperation with the officer in charge. If you can't be cheerful, be quiet. Experience has shown time and time again that the comfort and indeed the chances of survival of those adrift depend upon the frame of mind of the boat's company.

**Leadership.**—Almost everything depends on the bearing and conduct of the officer in charge. A confident, calm officer, who can assume responsibility, assign jobs to each, deal unhesitatingly with contingencies as they arise, take full charge of rations, navigation, and boat work goes further toward bringing his lifeboat into safety than any single factor. To assume this responsibility confidently requires knowledge and foresight, and the information given in this book will help the officer to achieve this desirable leadership. Officers will increase their confidence by assiduously taking all available small-boat practice beforehand. In the event of shipwreck, strict discipline must be maintained, and, if necessary, vigorously enforced.

**Basket stretchers.**—It is recommended that vessels be provided with a few basket stretchers to handle injured men and lower them over the side.

**Projections in boats.**—Examine your lifeboats and round off the edges of thwarts, smooth off jagged corners of bolts, rivets, etc., in order that they may not cause additional discomfort.

**Wire pennant—Sea painter.**—It has been recommended that on tank vessels and vessels carrying deck cargo of an inflammable nature that a wire pennant be attached to the sea painter on the end which is fast to the ship. This to prevent the line burning off, allowing the boat to drift away before she is loaded.

**Drinking water—Coral reefs.**—Survivors report that persons finding themselves on coral reefs can usually obtain brackish water suitable for drinking by digging down from 6 to 9 inches below the surface of the ground. The hole should be about 6 to 8 inches in diameter. Surface water will collect after a short time and may be scooped out for use. Digging deeper will defeat the end desired as the surface water will be penetrated and salt water reached.

**Spigots.**—Spigots should be removed from boats even though wooden water breakers are still in use. Well-bucket type of cups now required by the regulations provide the best means of getting water. Spigots may be stepped on and broken off and are a menace under wartime conditions.

**Man ropes.**—Knotted man ropes down over the bridge front to the forward well deck and over the side of houses have been found extremely useful. Where ports in accommodation spaces are 15 inches in diameter and over, it is recommended that a man rope be secured above and outside the port and of sufficient length to allow a person coming out through to provide a means of escape.

**Illumination of boat deck.**—In order that the best use may be made of the portable emergency lights provided, at least two such lights should be readily available for use on the boat deck. Men assigned to boat lowering stations and their alternates should be instructed as regards to the procurement of these lights. Some forethought should be given to where they are to be placed while the men are working and a hook or a lanyard provided in advance for that specific purpose.

**Extra hatchets.**—A number of small, sharp hatchets in strategic positions around the ship adjacent to lifesaving equipment will be found useful.

**Reel covers.**—Reels for use with rope falls should be provided with canvas covers to keep any oil thrown up by a torpedo or mine explosion from soaking the first layer. Such a cover also protects the fall under ice-making conditions.

**Luminous cards.**—Boat compass cards are available with luminous markings.

**Salt-water soap.**—Salt-water soap has been found very useful to survivors on boats and rafts.

**Whistle signals.**—Be sure you know the signals of the whistle. For boat stations—SIX SHORT AND ONE LONG. Regulation signals for handling boats: LOWER, ONE SHORT BLAST; STOP LOWERING, TWO SHORT BLASTS; DISMISS FROM BOATS, THREE SHORT BLASTS.

**Sleeping on hatches.**—Do not loll around on hatches or make your bunk on them for the night. Men have been lost primarily due to the fact that they were on the hatches when the torpedo struck. The same applies to sitting on rails. Be in a position at all times to best maintain your balance and keep from going overboard should the ship be struck.

**Marking oars.**—Difficulties have been experienced by survivors in lifeboats from torpedoed vessels in readily determining the position of the blade of the oar in the darkness, consequently, rowers "catch crabs" with consequent confusion to the boat's company. It has been suggested a flat place be planed on the loom of the oars near the handle to run parallel with the blade so that the position of the blade relative to the handle can be readily determined by touch.

**Sand.**—Oil thrown up by explosions frequently has made lowering of the boats difficult. It has been suggested that boxes or buckets of sand near lowering positions would be extremely useful. In colder weather sawdust mixed with sand can be utilized.

**Flashlight.**—Have the flashlight in its watertight container in the lifeboat in a definite place so that it can be readily located even at nighttime. Persons assigned to the boat should know its location in order that it may be utilized after the boat is afloat to locate and pick up persons in the water.

**Lash lifeboat equipment.**—Lash all lifeboat gear securely in the boat. On a recently torpedoed tanker the lifeboats were dropped into the water from the after fall. Most of the equipment fell out. Don't let this happen to your boats. Be sure to lash the equipment into the boat. Don't forget to lash the oars.

**Steering oar.**—Have the steering oar of the boat ready to use. It will have to be lashed in, of course, but paint the blade or perhaps the whole oar white in order that it may be readily picked out. Replace the steering rowlock with a wire grommet unless the steering rowlock is substantial and securely attached. This rowlock should be on the outboard side.

**Fair ship side for launching.**—If your vessel has open decks below the lifeboat position, fit horizontal or vertical bars as required by regulation, to prevent boats' swinging in under them on the high side. Check all projections below and do something about them either with wooden plugs or other fittings. Watch wind chutes below the boat positions.

**Watertight doors.**—Free all watertight doors which have to be opened or closed at sea. If necessary, provide additional mechanism in order that they may be easily closed. Otherwise men will leave them open. Shaft alley doors are important in this respect.

**Lash fire extinguishers.**—Lash fire extinguishers (portable type) into position. If needed the lashing can be quickly cut with the sharp jackknife which all seamen carry. Otherwise, concussion will knock them down and they will be found operating and flooding spaces with foam or soda acid solution, which creates more confusion and makes decks slippery.

**Radio antenna.**—Check antenna halyards. Be sure the safety link recommended by the Federal Communications Commission is provided. Wire halyards are recommended. Emergency antenna should be strongly rigged to separate supports from those holding the main antenna.

**Secure accommodation doors.**—Keep all accommodation doors lashed open. If hooked back, mouse the hook or otherwise secure it. Concussion will slam doors closed if they are not lashed and the alteration of the ship's structure may make it impossible to open them. Doors which are closed will probably be jammed closed. Put some hand rails or lines in the alley ways. If the ship starts down by the head or stern, it is very difficult to get up through a fore and aft alley way unless lines or rails are fitted.

**Secure deck equipment.**—Secure all loose items of deck equipment, stores, and odds and ends. If you are torpedoed, this stuff thrashing around will cause you no end of difficulty. In one



instance a box of life preservers was not securely lashed and slid across the boat deck into a lifeboat. Battery boxes and all such items should be *securely lashed*.

**Fire-resistant canvas.**—The use of canvas which has been treated with fire-resistant material in fabricating boat covers or awnings would be desirable. A fire-resistant paint that is fairly efficient is available to paint existing lifeboat covers.

**Whistle.**—In several casualties the whistle cord has been drawn taut by the change of the ship's structure after the torpedo struck. The continual blowing of the whistle consequently made it next to impossible to hear orders and instructions. It has been suggested that a long safety loop be inserted in the whistle pull and seized with material of sufficient strength to hold when the whistle is manually blown, but which would break under any undue strain, the release of the loop providing sufficient slack to allow the whistle valve to remain in the shut position.

**Warm clothing—All waters.**—Remember if you have to abandon ship you will need some warm clothing, even in the tropics due to the damp, cold night air. In this connection, protection from the sun is particularly important. Take a hat. Keep these clothes where you can get them quickly at any time.

**Use of existing air tanks for drinking water.**—If you are engaged in converting air tanks for use as drinking-water tanks to provide the additional water now required, i. e., 10 quarts per person, be sure that the old tanks are not painted with red lead on the inside. Red lead or any lead containing paint on the interior of drinking water tanks should be strictly avoided as even the smallest amount of lead dissolved in drinking water has extremely injurious results and causes lead poisoning. There are commercial preparations specially designed for painting the interior of metal fresh water tanks. Information concerning them may be obtained from merchant marine inspectors or from Headquarters.

**Boiler fuel oil.**—There have been several cases during the present war where survivors have been able after the initial abandonment, to reboard their ship and aid in bringing her into port under escort. In more than one of these cases it would have been possible to raise steam on the damaged vessel if, prior to the original abandonment, the fuel oil supply to the boilers had been cut off. The importance of carrying out this simple procedure, if the position where the shut-off valves are located (remember extensions above bulkhead deck are fitted) is accessible after enemy action, should be stressed and the reason discussed with the engineers and responsible members of the engine department. Drills should include instruction in shutting down these valves.

**Releasing gear.**—Every member of the crew should know the location of the releasing gear in the boats and its method of functioning. Paint the releasing rod or handle white as well as the surrounding area in order that it may be quickly distinguished.

**Safety harness or belt.**—Officers and men carrying out rescue work during the war have experienced many occasions where the difficulty of taking men rapidly from the water has caused considerable loss of life. Men adrift in life jackets and in a semiconscious or stunned condition cannot readily be taken aboard by a line unless some harness or belt is fastened around them to which the hoisting line can be fastened. Regular safety belts are recommended for use in this connection. Such a belt worn over a regular life jacket or an improvised safety harness fabricated of, say, 1-inch rope can be utilized. If made of rope the two suspender ends should be spliced into the belt on the back and threaded through in a cross at the center of the back, the ends to lead over the shoulders. These ends should each be fitted with an eye splice through which the front part of the belt can be threaded and the free ends tied in front. Rescue vessels may utilize lines fitted with snap hooks which can be readily attached at the cross in the back thus allowing the man to be quickly drawn up over the side or into the rescue boat. It is recommended that the safety belt or harness be worn at all times when life jackets are worn.

**Exercise in boats.**—The maintenance of bodily health and vigor while being confined to the space afforded in a lifeboat can only be accomplished by a certain amount of exercise. Sitting con-

tinuously in one position on thwarts or side benches impedes the circulation and the nervous supply to the legs. The remainder of the body suffers impairment due to the lack of exercise. Ingenious efforts on the part of the officer in charge can do much to improve this situation. For example, when under sail men can be exercised by placing the oars in position and rowing them back and forth in the air. In the lower latitudes survivors have reported enjoying swimming and hanging over the side of the boat thus obtaining refreshment from immersion in the sea. They have stated that such bathing allayed their thirst and improved their digestion. Assigning specific tasks to each member of the boat's company goes far to improve morale. Keep the men busy *doing something*. Establish responsibilities and duties even though these would seem minor and inconsequential under ordinary conditions.

**Boat sailing.**—Every opportunity should be taken to improve the knowledge of the officers and men in handling lifeboats under sail. Survivors have found that a lifeboat can be sailed closer to the wind by improvising a boom from a boathook to stiffen the foot of the sail.

**Constipation—Use of laxatives.**—Survivors adrift in lifeboats or on rafts are unlikely to have any bowel action. The small amount of food ingested and the limited amount of drinking water is responsible for this condition. Medical authorities advise, however, that the use of laxatives under such conditions will do far more harm than good, inasmuch as their use deprives the body of large amounts of water. The action of laxatives further disturbs the digestion of the food already in the stomach. Do not worry about apparent constipation.

## UNINHABITED AREAS

If you land on islands without people, follow these instructions:

**Water.**—Dig a hole at low tide just below high water mark. The water which runs in may be salty and discolored, but it can be used. Drink moderately the first day, or it may make you sick.

If there is a salt marsh or pond behind the beach, dig near the foot of the slope which runs to it. You may find fresh water from three to five feet down. Since fresh water is lighter than salt, go no deeper than where you first find it.

On jungle islands, water may be found at the base of the leaves of air plants growing in the trees. Strain out bugs and wigglers. The water is good to drink.

Standing fresh water anywhere in the tropics is dangerous. Boil it, if you can, before drinking. You can boil water in a section of bamboo before the fire burns through. Or heat stones in the fire, pick them up with branches bent like tongs, and throw them in. Begin with a little water and then add more water and more stones.

Where there are no people, running water is usually safe.

**Turtles.**—Turtles come ashore, mostly at night, to lay their eggs. Turtle eggs are good. Find them by following the trail the turtle makes across the sand to where the eggs are buried. Dig them up. When cooked, turtle eggs do not get hard like hen's eggs. Eat them cooked or raw. Bite a hole in the shell and squeeze.

To turn a sea turtle on land, catch it by the shell near a hind leg and lift quartering forward. Once turned it cannot get away.

**Plants.**—Most tropical fruits, but not all, are good to eat. Some are unsafe. At the very top of many palm trees is a large tender bud or cabbage. Cut it out and eat it raw or cooked. The trunks of some palms, if cut into, will drip good water.

Rattans, long slender vines with sharp curved thorns, also have cabbages at the top. Good drinking water will often flow from the cut stem of a rattan.

The thick stem of a growing bamboo, like rattans and palms, holds drinkable water. Cut off the stem and catch the water as it drips. Bamboo sprouts up to a foot high can be eaten raw or boiled. So can young leaf sheaths of bamboo, and the young curled over shoots of ferns.

Coconuts contain delicious, cool, nutritious water (called coconut milk) and valuable white meat. Strip off the husk and break in.



Breadfruit is oval, about 6 inches across, with a warty surface. To roast it, put it in a hole in the ground, cover it with leaves, lay hot stones around it, and cover the whole with dirt.

The durian, a large fruit with great spines, smells horribly, but tastes like custard. Eat it raw.

**Food from fresh water.**—Fresh water fish of any kind, fresh water snails, shells, crabs, shrimps, and crawfish are all unsafe to eat unless thoroughly cooked. Cook fish like breadfruit. The snails and others, drop alive into boiling water. Use your dip net to catch fresh water shrimps. They often hang to branches that dip in the water, and can be lifted out. Or make a dam in a stream out of mud, sand, or whatever you have, and look for shrimps when the water drains out below it. Eat the shrimp meat but spit out the shells.

**Food along shore.**—Fish are found in pools on reefs, in shallow water, or among rocks at high or low tide. Use your harpoon or block the opening of a pool at high tide so the fish cannot get out. Poisonous puffers sometimes go into fresh water. The flesh of other fish in fresh water is never poisonous, when cooked.

Fish are sometimes found out of water on rocks or trees. They are good to eat.

In parts of New Guinea there are great spiders which may help you. Make a flat net by bending a branch and passing it back and forth through a number of the webs. Then bait it with a bug and set it where small fish can see it. Their teeth will get tangled in the web.

By dragging several of the great leaves of coconut palms through shallow water, fastened together, fish may be driven ashore.

**Shell fish.**—Shell fish and their juices are good to eat and drink, whether cooked or raw. Many bury themselves in the sand, leaving small holes. Dig for them. You may find shell fish also among the rocks, hanging to the branches of trees that dip in the water, or crawling on the bottom at low tide. Land crabs, carrying sea shells on their backs, are often very common.

Only two kinds of sea shells are dangerous. Each is in a single piece. One is shaped like a sharp spindle. The other is thicker, rounder, open the length of the shell, and shaped like a short flat cone at one end. They are found in tropical parts of the Pacific and Indian Oceans. The animals inside the shells have poison teeth and are dangerous. Let them alone.

**Animals and insects.**—All animals are safe to eat—monkeys, bats, lizards, land turtles, frogs, and even snakes, including poisonous snakes, if they have not bitten themselves. Snakes taste like frog legs or the white meat of chicken. Grubs found in the ground or in rotten wood make good food. So do grasshoppers, toasted on a stick. Pick off legs and wings before cooking. But do not eat any caterpillar. Many are poisonous.

**Birds.**—All birds are good to eat, cooked or raw. Their blood and livers are eatable.

Birds will sometimes light on the boat or on your back or head. Catch every bird you can. Save the feathers. Use them to make fishing jigs. Stuff them inside your shirt to keep you warm. Or skin the whole bird, take the meat and bones out of the wings, and leave the wings attached to the skin. Dry the skin with the feathers on it in the sun and use it to wrap around your neck or cover your back. The meat, guts, and even the toes of birds make good bait.

Birds follow schools of fish and show you where they are. When feeding on a school, birds sometimes get so excited that you can get right up to them and harpoon them. Watch for fish also.

You can sometimes catch small birds with your dip net. Larger birds will often take a bait of fish on a hook trolled or dragged on top of the water. If nearby, they will often come after chum or a piece of fish tossed into the air.

**People.**—Nearly all native peoples are friendly to Americans. Show them that you are friendly too. Except along the coast and in the Northern mountains of New Guinea, you can almost always go to them safely for help.

**NOTE.**—These instructions do not and cannot cover all cases. The best advice of all is to keep using your head. Many other men before you have saved their lives by doing just that.

## ACTION IN EMERGENCY

**Minimizing the effect of explosions—Blast.**—If bomb hits are anticipated and duties permit, lie flat on the deck with the head and body hard against a ledge side or deck, to minimize exposure both to the blast wave and to fragments, and to prevent being thrown. Standing with the head against something solid offers similar, although somewhat less effective, protection. Heavy clothing tends to cushion the impact of the blast wave against the body; the most severe cases of blast injury are likely to be seen in those who are lightly clad or stripped for action at the time of the incident.

**Flash.**—The burns caused by flash from explosions are common and affect the parts of the body which are left uncovered. Therefore, when there is any risk of flash burns, keep the skin covered as far as possible, if only by thin clothing. The protection offered by your garments is increased if they are wet.

**Going overboard.**—If you do not get away in a boat, go over the lower side if the ship has listed. Use a ladder or a line, if available. If you go over the upper side you will be in danger of being badly hurt by barnacles and marine growths and of fracturing your ankles by hitting your heels against the bilge keel. When the lower side of the listed vessel happens also to be the weather side, take care to avoid being washed back on board, and in this case, if possible, take to the water from the bow or stern, whichever is the lower.

If you have to jump from the ship into burning oil you may, if you are a good swimmer, be able to avoid being burned if you adopt the following procedure, which has been tested and proved successful: Jump feet first through the flames. Swim as long as you can under water, then spring above the flames and breathe, taking a breast stroke to push the flames away, then sink and swim under water again. Men have been able to navigate up to 200 yards of burning oil in this way. To be able to do this, however, you will have to remove your lifebelt and other cumbersome clothing.

**In the water.**—Many men have lost their lives through losing their heads and thrashing about in the water. Look for a lifeboat or raft, or some other floating object; swim slowly towards it and get on board or support yourself with it. Do not exhaust your strength by swimming about uselessly. Your red light will attract the attention of your mates in the lifeboat at nighttime. Remember that a red light indicates a man to be picked up, a white light indicates a raft, float, or buoy.

**Protection against sun and heat.**—Rig up an awning if you possibly can, and try to arrange some cover for the man at the tiller.

Do not take off too many clothes; they will protect your skin against sunburn. Do not forget this also applies to your legs and feet, which should be kept covered or in the shade. Remember that even in misty weather you can get badly sunburnt. Protection against tropical sun can be secured by wearing a shirt or vest and some form of headgear kept wet by occasional soaking in sea-water.

Various substances give protection against sunburn. A number of these are available in proprietary preparations, and they may be applied to the exposed skin as directed. Fuel oil will not give protection, and greasy preparations such as ointments tend to "fry" the skin and should not be used.

You can protect your eyes against the glare of the sun on the water by improvising some kind of eyeshade. Thus, you may tie a cloth or bandage over your nose, so that when you look straight forward it hides the horizon and cuts off glare coming from the water.

## SWIMMING

**Keeping afloat.**—The seaman who finds himself in the water miles from shore is certainly not going to try to swim to shore. Instead, he will try to keep afloat until such time as he is rescued. Keeping afloat in the water any length of time depends upon many factors. Energy must be conserved to remain afloat in the water. The seaman's ability and previous training in swimming will affect his chance of staying afloat. The type of sea—that is, cold, rough, warm, calm, or oily water—will in all probability play a great part in what the seaman can do to stay above the surface. In the following paragraphs these factors will be more fully discussed.



**Life jacket—Wreckage.**—Let us assume that a sailor finds himself in the water approximately 30 miles from shore. What can he do to help himself until he is rescued? If he has had time to make use of a life jacket, then he is in a position of comparative safety for some time. However, if, as in many cases, he is not able to get to the life jacket, then it will be necessary for him to make some adjustment. Any floating debris that he can reach will be of help in keeping him up. If there is little or no wreckage, then he will have to depend upon his own swimming ability.

**Methods of floating.**—What can he do to maintain himself in the water? First, it must be remembered that he may have to remain in the water for some hours. For this reason floating will be of great use to him. Most individuals can float on their back with a slight movement of the arms or legs. (It should be noted that the seaman should take off his shoes either before he enters the water or during the time he is in the water. Shoes or boots often fill with water and cause a "heaviness" in the legs.) In the position of floating on the back the seaman can rest and breathe without much difficulty. The arms should be kept in the water and moved slowly, approximately the same as the oars of a boat when rowing. They may be moved alternately or together. The leg action should be a slow kick, preferably an up and down kick of the legs. The arm stroke or the leg stroke should be carried on slowly and with a short arc of movement. Slow, relaxed stroking conserves energy and, hence keeps the swimmer afloat with a minimum use of energy.

**Dog paddle—Breast stroke.**—If locomotion is needed to swim to a raft or lifeboat or away from a sinking ship, then the seaman may employ the dog paddle or a modified form of the breast stroke. When the modified breast stroke is used the breast-stroke kick should not be used because it requires too great an expenditure of energy for the distance that the swimmer can get from that leg action. Instead, it is prescribed that the up-and-down kick of the legs with the breast-stroke movement of the arms be employed in this modified breast stroke. Both the dog paddle and the modified breast stroke are quite effective in sea water. These two strokes are extremely efficient in terms of the amount of energy needed to use them and the distance that can be covered.

**Oil-covered surface.**—These two swimming strokes are also advocated because they are most effective when swimming through oil-covered water. By using the modified breast stroke a path can be cleared through the oily water by pushing the oil away from and to the sides of the swimmer. Thus a clear path for swimming is opened in front of the swimmer. This same clearing of the oily water can be done when swimming the dog-paddle stroke. A few facts should be noted concerning the problem of swimming through oil-covered water. As has been indicated above, the strokes suggested are the most effective. However, it should be remembered that, when coming up through the oil surface after having jumped or dived into the water, the eyes and mouth should be kept closed until the shoulders are clear above the oily surface. With the shoulders above the surface the seaman can then open his mouth and inhale quickly. He should also open his eyes in order to check on his position in the water. It should be emphasized that the swimmer should not inhale until he has come clear above the surface of the oil—that is, approximately to the shoulders. Exhale through the nose and mouth. The sailor should check the direction of the wind before going into the oil-covered water. He should swim to the windward so that he can get away from the oil patch on the surface of the water as quickly as possible.

**Underwater swimming.**—Another good means of swimming through oily water is underwater swimming. While under water, the seaman should swim as far as he possibly can, by using either the dog-paddle stroke or the modified breast-stroke. It will be necessary, of course, to change the stroke somewhat since the sailor is swimming completely immersed. After swimming as far under water as possible, the seaman should then come up above the water so that his shoulders are clear of the surface before he inhales again. He then should submerge and swim as far as he can go before coming up again to breathe. These methods described above can help the seaman navigate through oily water if and when necessity arises.

***Keep calm and relaxed.***—It must be emphasized that the safety of the swimmer under any swimming conditions depends upon the swimmer's own ability, calmness, and appraisal of the situation and his previous swimming training. Hasty, panicky actions may be detrimental to the seaman. Occasions will arise when the utmost stress is placed upon the individual seaman. Not only his own life, but the lives of his shipmates may depend upon his own individual intelligence and calm actions.

***Leaving ship—Direction of swimming.***—Unless circumstances indicate to the contrary, seamen should go overboard from (1) the opposite side of the damage by mine or torpedo; (2) as far forward as possible; (3) swim to windward; (4) if necessary to get into the water from any great height and if time permits, try to find a line to make fast and go on down over the side.



## CARE OF SURVIVORS

Experience to date has indicated the definite need for comprehensive instructions, educational in nature, for masters, officers, and seamen of merchant vessels concerning the care and treatment of survivors. The article below was prepared especially for this purpose by the Division of Preventive Medicine of the Bureau of Medicine and Surgery, U. S. Navy. *Read this article at least once, in order that you may not, by well meaning but misguided efforts, cause further injury to surviving personnel rather than aiding them toward recovery.*

### FIRST-AID TREATMENT FOR CERTAIN CONDITIONS COMMON AMONG SHIPWRECK SURVIVORS

This guide has been written to help you in giving first aid to shipwreck survivors before a medical officer can see them. To use this information to the best advantage, you should know the general principles of first aid, and you must know how to give artificial respiration and how to stop hemorrhage. And you must know the first-aid treatment of shock, burns, heat exhaustion, sun stroke, and of fractures.

You will have to use your own judgment in caring for cases of this kind. No hard-fast rules can be laid down because no two cases are alike and some people can stand up under hardships better than others. Going without food and water may cause much suffering among some survivors whereas others may not suffer greatly. Some persons can withstand exposure to sun, moisture, heat, and cold better than others.

Do not forget that burns, broken bones, flesh wounds, and the condition of shock are found often among survivors. First-aid treatment must be given immediately for these conditions. Another condition called "blast injury" should be expected in survivors who have been swimming or floating in the water when a depth charge, torpedo, or aerial bomb has exploded nearby. The destructive force of such a blast is transmitted in all directions through the water and is very likely to cause injuries of the lungs, stomach, or intestines. Because the injuries are internal, they can not be seen and may be overlooked. However, there are certain symptoms you should watch for and be ready to take immediate action when they appear. Shock may be the first and only symptom, or it may develop after the appearance of other symptoms. If the lungs are injured, the victim will have difficulty in breathing. He may spit up or cough up frothy blood. With injury to the stomach and intestines, the victim will complain of pain in the abdomen. Later, due to the severe internal inflammation, you may find that the belly is swollen or very firm and unyielding. It may feel rigid and boardlike when you put your hand on it.

The first-aid treatment of these conditions due to blast should be given immediately. The victim should be made to lie down with his head low and he should be kept warm. If you have morphine syrettes, give him sufficient morphine to relieve his pain and keep him comfortable. If his thirst is severe, water or other fluids may be given. If you suspect that an internal organ has been ruptured or that there has been internal hemorrhage, there is all the more reason for getting him medical attention promptly.

Survivors who have been at sea in an open boat or raft for several days or weeks usually will be suffering from one or more of the following conditions:

1. Extreme thirst.
2. Starvation (malnutrition and under-nutrition).

3. Painful and swollen feet ("immersion foot").
4. Frostbite and effects of prolonged exposure to cold.
5. Sunburns.
6. Inflammation of eyes caused by sun glare, oily water, or exposure.
7. Mental disturbances.

The treatment for each one of these conditions is described separately in this guide. Any one of several or a combination of them, or an injury, may cause shock. Survivors may be so weak that shock will develop unexpectedly when they attempt to climb out of a boat or raft.

*The survivors should be carried* from the boat or raft if possible, and no avoidable exertion should be allowed unless you are sure that there are no serious injuries and that the general physical condition is reasonably good. A good rule to follow is to keep the survivors lying down with the head low and the feet raised. After carrying them to a dry and fairly warm place, remove all clothes, but be very careful to handle the legs and feet as gently as possible. Survivors should be warmed up, but never put a hot water bottle or any direct heat against their feet, because you may cause permanent damage to their feet if they have a condition known as "immersion foot." Keep your patients at rest in a warm bed until all signs of exhaustion, shock, and mental distress have cleared up.

Be sure to ask the survivor how many days he has spent in an open boat and what the weather was like and if he was injured or sick. Don't forget to ask if he was swimming in the vicinity of an underwater explosion. Find out how much water and food he had and what kind of food rations were at hand.

You must examine each survivor carefully for injuries, burns, frostbite, swelling, numbness, paralysis, and unusual tenderness of any part of the body. Ask about pain in the arms and legs.

*Shipwreck victims often are covered with a heavy coating of dirty oil.*—This happens when a tanker is torpedoed and survivors are forced into oil-covered water. The oil can be removed by using another oil such as castor oil, mineral oil, lard, clean diesel oil, or other light oil as a wash and following it by the use of soap and water. On board naval vessels and in naval shore stations a special preparation called "Hypex" is used for this purpose. Also a 5 percent solution of "Dreft," "Drene," or "Orvus" can be used to remove oil. These are the trade names for several commercial cleansing agents. Soap and water must be used afterwards.

If the survivor is covered with a dirty coating of oil, some of it usually gets in his eyes. This causes an eye inflammation. Its treatment is described below in the section called "Eye inflammation." Oil that gets in the ears may cause earache. It can be relieved by gently flushing the ears out with lukewarm water. Oil that is swallowed may cause vomiting, diarrhea, and abdominal pain. These symptoms disappear quickly with rest in bed and a diet of only soft or liquid foods.

Survivors who have suffered from severe exposure may have small sores like boils or ulcers, covering all parts of the body that are not protected by clothing. Carefully clean the dirt from the skin and remove the crust from the sores. Treat the sores with an antiseptic. Do not touch the sores on the feet or legs if the condition known as "immersion foot" is present. You will know how to recognize it after reading its description below.

Don't start treating anyone until you have carefully read the treatment for all conditions described in this guide. The treatment of special conditions caused by exposure and lack of food and water will now be taken up.

### CARE OF SURVIVORS SUFFERING FROM EXTREME THIRST

If the victim has been exposed for a long time and has not had enough water, he will be suffering from extreme thirst. Except for shock and serious injuries, extreme thirst causes the greatest suffering and the most deaths among survivors. The treatment of starvation is not important when survivors are dying of thirst.



*Without food* the average man may be expected to live for about 21 days if he has water to drink. If he gets less than one pint of water per day and provided he gets no moist food, he will suffer from thirst after a few days. However, survivors have been known to live for 10 days or more on as little as 2 or 3 ounces of water per day without causing any apparent bodily damage. The amounts of water and food needed by a survivor depend upon weather conditions, physical exertion, and individual resistance.

Thirst may be so severe that it causes unconsciousness or extreme shock. Don't give water by mouth in cases of this kind. They should be treated for shock. After recovery from shock, they can usually take small amounts of sweetened water by mouth. It is best not to give alcoholic stimulants to survivors who are in need of water.

Do not try to give fresh water or salt water through a rubber tube or other device inserted into the rectum. If shock or unconsciousness cannot be overcome, the immediate attention of a physician is necessary. Great loss of weight, high fever, very fast pulse, convulsions and being unable to urinate are symptoms which show that there is serious damage and that prompt medical attention is needed. In most cases, however, small amounts of water can be taken by mouth immediately. If severe thirst is present and there is difficulty in swallowing and a dry mouth, a few ounces of water with sugar added should be given every 2 hours and the amount should be gradually increased. Use about a teaspoon of sugar to a glass of water. Usually these cases are also suffering from starvation and the feeding of soft and liquid foods will help in providing water. If moderate thirst is present it is treated by giving the victim all the water he can comfortably take and as often as he likes.

After the water balance of the body has been brought back to normal, the survivor's feet and legs may swell. This swelling may be due to (1) "*immersion foot*," (2) *lack of vitamins in the diet*, (3) *lack of meat and other proteins in the diet*. Keep the victim's feet raised above the level of the body until the swelling goes down.

You may wish to give one of the sulfa drugs by mouth for the treatment of severe burns or flesh wounds. *Do not give sulfathiazole, sulfadiazine, or any of the sulfa drugs* until the survivor has had enough water to overcome his thirst. If his thirst is extreme, this may take several days.

Don't be alarmed if for the first week or more after rescue, the survivor complains of urinating more often than usual.

## STARVATION

Most of the survivors after long exposure are suffering from starvation. The effect of starvation is much like that of severe thirst. It may be so severe that unconsciousness or shock will result and no attempt to give food or water by mouth should be made until the shock has been treated. Usually the victims have lost a great deal of weight. They may have fever and breathing may be shallow and fast. Keeping them at rest in a warm bed is of the greatest importance in treating both starvation and extreme thirst. If they have trouble in swallowing, dry mouth, and difficulty in urinating, you must treat them for thirst before giving soft or solid foods.

*In general, the feeding of starved victims is like feeding a person who is just recovering from a serious illness.* Give them small amounts of easily digestible foods at frequent intervals. For stimulants, give hot tea or coffee with sugar added. Victims who have been starved for 3 weeks or more and those who have been on a poor diet before shipwreck will usually need vitamins. To supply vitamins and fluids, give sweetened fruit juices (fresh orange juice, fresh lemonade, and canned grapefruit juice). The juice from ordinary canned tomatoes may be given and is usually less apt to cause an upset stomach than canned tomato juice.

*Extreme lack of vitamins* often causes sore mouth, swollen and bleeding gums, ulcers of the eyes, skin troubles, and swollen legs and arms. The sores in the mouth may be very troublesome, causing ulcers and difficulty in eating. Concentrated vitamins (of the kind that contain several vitamins including vitamins B and C) should be given. Two or three times the usual daily dose should be given. Remember that the lack of vitamins is more apt to cause trouble in warm and tropical

climates. If you do not have vitamin pills, the treatment for starvation which is described below will help until the victims get medical attention.

*On the first day of treatment*, give either fresh milk, condensed milk, or canned evaporated milk. Water must be added to the canned evaporated milk so that it has about the thickness of fresh milk. Sugar should be added to the fresh milk and evaporated milk, but it need not be added to sweetened condensed milk. Do not give cream or greasy foods for the first few days. Clear soups and broths are good if they do not contain much fat. Gruel such as oatmeal, cream of wheat, or other well-cooked cereals with sugar and milk added are good. *Usually on the second day* toast and bread can be added to the victim's diet and *by the third day*, regular full, well-balanced meals can ordinarily be given.

A condition known as *nutritional* or *famine edema* may be seen in victims who have been starved for a period of 2 months or more. It is a result of not getting enough meat and other protein foods. In addition to the starved appearance, there is a swelling of the feet, legs, hands, and arms. To treat such cases, give foods having a high protein content, such as eggs or meat. At first, give egg drinks and broth or soups. Try to get such cases under medical attention as soon as possible because they usually need hospital care.

Survivors who have been on small food or water rations or without food or water for several days often become alarmed because they have few or no bowel movements. This is to be expected and no first-aid treatment is necessary except when survivors have had practically nothing to eat except canned milk. For such cases an enema may be given for the treatment of constipation.

### "IMMERSION FOOT"

If a survivor has been sitting in an open boat for a long time, his feet are often cold and wet. Actually they may have been immersed in icy water in the bottom of the boat. This causes a condition called "immersion foot." It may develop even though the victim has been wearing shoes or boots. Usually the first thing noticed is painful feet and then a few days later the feet and legs begin to swell. These first symptoms are much like chilblain even though the water temperature may have been above freezing. After a time discoloration of the skin appears and blood or water blisters, ulcers, and even death of the tissues may occur. The feet feel numb, and they may become paralyzed. Numbness and tingling sensation may be felt in the arms and hands.

You have read above that swelling of the feet and legs may occur with a poor diet, especially if there has not been enough vitamins or enough protein. This condition is different from the swelling of "immersion foot," because in "immersion foot" there is *much pain*, often discoloration of the skin, and the feet are likely to have ulcers or sores on them. These other symptoms are not found with the swelling caused by a poor diet.

First-aid treatment for "immersion foot" is very important because the vitality of the legs and feet has been lost and the *tissues are easily damaged*. With treatment, the circulation of blood in the legs and feet is improved, but remember that too rapid a return of circulation may cause severe pain and further damage. *Be very careful in handling the limbs* while numbness is present, to keep from injuring the flesh. Keep the victim's feet and legs raised above his body level and put cold compresses on them every 15 or 20 minutes to relieve the pain. For compresses use cloths that have been soaked in cold water and wrung out. Instead of compresses, ice bags may be used if a towel is placed underneath to protect the flesh. An electric fan blowing cool air over the feet may be as comforting as either compresses or ice bags. Keep the rest of the victim's body warm by applying heat. The arms may be placed in hot water to gradually warm him up. *Never put direct heat on a foot or leg suffering from immersion*. Massage is harmful to the legs and should not be used. If you have sulfanilamide powder, you should dust it into any ulcers, cuts, or sores that may be present on the limbs. Place the injured limb or limbs in dry cotton or wool and keep them cool. Don't use any type of dressing or bandages because it may stop the circulation. You may have to keep up the treatment several days or weeks before the symptoms of "immersion foot" disappear. As long as



there is paralysis or swelling or pain, the patient should not be allowed to walk and the treatment should be kept up.

### FROSTBITE AND PROLONGED EXPOSURE TO COLD

Survivors who are in a weakened condition and who are starved are apt to suffer severely from the effects of cold. *When the whole body has been exposed to severe cold* the victim becomes numb, it is difficult for him to move, his eyesight fails, and he may become unconscious. In such a case, carry the patient to a cool room and warm him up very slowly. If breathing has ceased, give artificial respiration. Rub the limbs briskly with cloths wet in cool water. When he begins to come to, give him a hot stimulating drink, such as coffee, tea, or cocoa, also slowly make the room warmer or move him to a warmer room. Then put the patient in a warm bed. If the patient is only chilled and is not unconscious and no parts of his body are frozen, he should be put in a warm bed at once and given hot stimulating drinks.

*Frostbite is the freezing of single parts of the body*, most often the nose, ears, cheeks, fingers, and toes. Frostbitten hands or feet are usually very painful. Frozen ears, cheeks, and nose are not painful and the victim usually does not realize they are frozen until someone notices the color change and tells him about it.

In thawing out frozen parts of the body *never use heat*. If the parts thaw too fast, pain and swelling result. The skin may peel off, leaving a raw surface and there is danger of infection.

*In first degree frostbite*, sometimes called *chilblain*, the skin is a dark red color and the part is painful. *In second degree frostbite*, the skin is bright red and there are blisters. *In third degree frostbite*, the frozen part is pale, stiff, and brittle. Treatment should be started by putting cold wet cloths on the frosted part. Do not rub snow or ice on it. The temperature of the water in which the cloths are soaked should be raised gradually (a degree or two every few minutes) until it is lukewarm. If there are blisters, do not open them. Stop this treatment when the skin color is normal again and apply boric acid ointment to the frozen areas. Parts that are dead as a result of third degree frostbite will, of course, not improve with treatment and gangrene (death of the tissues) sets in. Cases like this need medical attention as soon as possible.

### SUNBURNS

Sunburn of survivors can be very serious and deaths have resulted from it when large areas of the body have been burned as a result of scanty clothing. Exposure in an uncovered boat or raft can cause sunburn even under a cloudy sky. A well-tanned skin does not always protect against sunburn.

*First aid treatment for sunburn* is the same as for any burn. *For moderate sunburn* where the skin is reddened and very small blisters appear, a burn ointment such as tannic acid ointment should be used. If you have no burn ointment, use cold cream, preferably mentholated, or use calamine lotion. Use zinc oxide ointment in cases where the skin has begun to crack and peel.

*For more severe burns* where large blisters are present, put on a wet dressing of boric acid or a dressing of Epsom salts solution. Be careful not to open any blisters that have not already broken. Usually fever is present in cases of this kind and in cases where large areas of the body are moderately sunburned. Feverish patients should be kept in bed, and drinking water and other fluids should be plentifully given.

### EYE INFLAMMATION

Eye inflammation often occurs among survivors. It may be caused by exposure to wind, cold, or salt water; another kind called "reflection blindness" is caused by exposure to sunlight or sun glare reflected from water, snow, or ice. Eye inflammation is also caused by oil that may get in the eyes when survivors have to swim in oil-covered water.

*The symptoms of eye inflammation* are about the same whatever the cause. Where oil is the cause, the eyes look oil-stained and dirty. Eye inflammation causes the eyes to be red, bloodshot, overflowing with tears, sometimes painful, and there is often a sticky crust on the lids. Looking at a bright light is usually painful to the victim.

*Use a 2-percent baking soda solution or a boric acid solution* to wash out the eyes. The solution should be dropped in the eyes using an eyedropper or medicine dropper. You can make the baking soda solution by adding 1 level teaspoonful of baking soda to one-half pint of water. If you cannot make up the baking soda solution, use boric acid solution. Cold compresses (ice bags or cloths wrung out of cold water) should be placed over the eyes for 10 minutes out of every hour that the eyes are painful. Don't use the cold compresses if there are ulcers in the eyes, but get medical attention as soon as possible. If you have a supply of clear, clean, mineral oil on hand, use a drop of it in each inflamed eye three or four times per day. Use an eyedropper or medicine dropper to drop it into the eyes. Do not put any bandages or covering over the eyes. Have the victim wear dark glasses until all the inflammation is gone. If the victim complains of severe burning in the eyes, use a weak local anesthetic such as butyn ophthalmic ointment, or pantocine, one-half-percent strength.

### MENTAL DISTURBANCES

Mental disturbances are common among survivors as a result of their severe hardships. Such complications are most often seen in victims of middle age or older who are in poor physical condition. Fatigue and exhaustion cause nervousness or depression. When victims are rescued they may be so happy and excited that their minds are temporarily unbalanced. Survivors may become boisterous and very excitable.

When a victim is delirious, it usually shows that he has a fever and is seriously ill. Convulsions and delirium sometimes result when desperate survivors have taken to drinking sea water. People who drink sea water seldom recover. Mental disturbances usually clear up with rest and with treatment for the other conditions described in this guide. You may have to give mild sedatives such as phenobarbital or bromides to help the victim relax and sleep. Rest in bed in a quiet room, and sedatives, should be provided for several days or weeks when the mental condition is especially serious and slow to improve.

Remember that recovery is usually rapid and complete in most survivors if they are promptly and properly treated. Don't think that any case is hopeless even though it may appear to be so. If you follow the directions for treating survivors that you have read above, you will prevent further suffering, start victims on the way to early recovery, and you may save a life.



## **APPROVED EQUIPMENT**

### **EMERGENCY RADIO TRANSMITTERS**

Mackay Radio & Telegraph Co., type 168-B (portable).  
Radio Marine Corporation of America, type ET-8026 (portable).  
Technical Radio Co., type ST 5M (portable).  
Radio Marine Corporation of America, type ET-8022A (installed in lifeboat).

### **ELECTRIC WATER LIGHTS**

Standard Oil Co. of Louisiana, Baton Rouge, La., electric type, vaporproof floating, lighting buoy (1936).

Electric Water Light Co., Cincinnati, Ohio, Riner water light (1938).

C. C. Galbraith & Son, Inc., New York, N. Y., Safe-T-Glo electric water light, type M, No. G-451-1 (1941).

Sun Shipbuilding & Dry Dock Co., Chester, Pa., Ramsey-O'Neil electric water light (general arrangement, drawing dated July 29, 1941) (1941).

Sculler Safety Corporation, New York, N. Y., automatic electric water light (gravity switch) U. S. N. type (drawing No. W. L.-1) (1942).

Coston Supply Co., New York, N. Y., Coslite automatic floating electric water light (drawing No. 10, dated June 15, 1942) (1942).

Winner Manufacturing Co., Trenton, N. J., automatic floating electric water light, type ML4 (drawing No. ML43, revised Dec. 12, 1942) (1943).

### **EMERGENCY LIGHTS**

Delta Electric Co., Marion, Ind., portable emergency light (No. 9-S-5311-L, Alt. 1—hand lantern, type J-1) (1942).

Emergency Light Corp., 140 Liberty Street, New York, N. Y., type E-N-42 Hulst emergency light unit (drawing dated July 31, 1942, rev. September 15, 1942) (1942).

### **LIFE-PRESERVER LIGHTS**

Delta Electric Co., Marion, Ind., Delta life-preserver light, type A-2050 (drawing dated May 23, 1942) (1942).

Taunton Pearl Works, Taunton, Mass., Taunton life-preserver light, type M. S. L. 1263 (drawing dated May 15, 1942) (1942).

Colvin-Slocum Boats, Inc., New York, N. Y., life-preserver light, model A (drawing No. 302-B-1, rev. June 10, 1942) (1942).

Fulton Manufacturing Corporation, Wauseon, Ohio, model NR life-preserver light 3450 (drawing dated June 16, 1942, rev. June 10, 1942) (1942).

Henry A. S. Van Daalen, 17 E. 42d Street, New York, N. Y., Dutch Admiral life-preserver light (drawing dated June 20, 1942, rev. September 1942) (1942).

## FLASHLIGHTS

Bond Electric Corporation, Jersey City, N. J., Bond flashlight, No. 3202-SB, 1931 model (1930), Bond flashlight, three-cell, focusing (1935).

Bright Star Battery Co., Hoboken, N. J., Bright Star flashlight, No. 323 (1935).

National Carbon Co., Inc., Cleveland, Ohio, Eveready flashlight, No. 2672 (1930) Eveready flashlights, Nos. 351 and 2695 (1935).

Ray-O-Vac Co., New York, N. Y., Ray-O-Vac flashlights, Nos. 2333 and CS233 (1936).

Winchester Repeating Arms Co., New Haven, Conn., Winchester flashlight, No. X-6824 (1936).

National Carbon Co., Inc., Cleveland, Ohio, Eveready automatic, No. 8351 (1938); Eveready, explosion-proof (for use in pump rooms of tank vessels), Nos. 3259 and 3359 (1938).

Ray-O-Vac Co., Madison, Wis., No. R-32 (1936), No. 23FS (1937).

Stewart R. Browne Manufacturing Co., Inc., New York, N. Y. Tuffite, type F-30, flashlight (1939).

National Carbon Co., Inc., Cleveland, Ohio, Eveready No. 2672 (modified), flashlight for lifeboat use (1939).

National Carbon Co., Cleveland, Ohio, Eveready flashlight No. 1351 and Eveready flashlight No. 1359 (1940).

Bond Electric Corporation, New Haven, Conn., Bond flashlight No. 3252 XB (1942).

Stewart R. Browne Manufacturing Co., New York, N. Y., type F-90 safety flashlight (1942).

Bright Star Battery Co., Clifton, N. J., Bright Star flashlight No. 723M (1942).

William M. Lennan, Inc., Los Angeles, Calif., Rub-R-Lite flashlight, three-cell type (1942).

## FLASHLIGHT BATTERIES

The flashlight batteries listed below comply with Federal Specification W-B-101a, and may be used in lifeboat flashlights *when marked with the date of manufacture and the date of expiration of guarantee period for marine use.*

Name of manufacturer	Trade name	Identification number	
		Type D, single cell	Type T-3-D, 3-cell
Bond Electric Corporation	BOND	102	112
Do	FRANCO	1051	1027
Do	WINNER	1	
Bright Star Battery Co.	BRIGHT STAR	10M	05-17M
Burgess Battery Co.	BURGESS	2	232
General Dry Batteries, Inc.	GENERAL GOLD LABEL	D	
Marathon Battery Co.	MARATHON	120	
National Carbon Co., Inc.	EVEREADY	950	705-S
Ray-O-Vac Co.	RAY-O-VAC	2	
Do	do	2LP	
Do	do	Navy Type	
Do	do	Navy Type LP	
United States Electric Manufacturing Corporation.	USALITE	995	905
Winchester Repeating Arms Co.	WINCHESTER	1511	3511



### LIFESAVING SUITS

Goodall Rubber Company, Inc., Philadelphia, Pa., Goodall style CF "Overboard" suit (1942); Goodall style RC "Overboard" suit (1942).

B. F. Goodrich Co., Akron, Ohio, B. F. Goodrich Co., lifesaving suit, model 1 (1942); B. F. Goodrich Co., lifesaving suit, model 2 (1942).

R. L. Morey Co., Inc., New York, N. Y., Boston fire-resistant overboard cover-all lifesaving suit, model CM (1942).

Seamless Rubber Co., New Haven, Conn., model M-M-1 lifesaving suit (1942).

Universal Life-Suit Co., Los Angeles, Calif., Universal lifesaving suit (1942); Universal lifesaving suit, model LSS-2 (1942).

Vaco, Inc., New York, N. Y., Vaco lifesaving suit (1942).

The Watertight Slide Fastener Corporation, New York, N. Y., Morner lifesaving suit (1942); Victory lifesaving suit (1942).

NOTE.—Lifesaving suits must be worn with one of the approved kapok life preservers listed below.

### LIFE PRESERVERS SUITABLE FOR USE WITH LIFESAVING SUITS

Type designation	Approval No.	Name and address of manufacturer
No. 17M (24-ounce)-----	B-153	Cluff Fabric Products, Inc., New York, N. Y.
No. 5T (24-ounce)-----	B-155	Do.
MC (24-ounce)-----	B-156	Grand Novelty Co., New York, N. Y.
CS-2-----	B-158	Colvin-Slocum Boats, Inc., New York, N. Y.
SAKJ-14-----	B-161	Seaway Manufacturing Co., New Orleans, La.
24-ounce adult quilted type-----	B-162	Acme Products, Inc., New Haven, Conn.
10-B-3-----	B-163	American Pad & Textile Co., Greenfield, Ohio.
SAKJ-17-----	B-164	Seaway Manufacturing Co., New Orleans, La.
10-B-1-----	B-165	American Pad & Textile Co., Greenfield, Ohio.
T-87 (24-ounce)-----	B-167	Cluff Fabric Products, Inc., New York, N. Y.
24-ounce adult quilted type-----	B-169	R. L. Morey Co., Inc., New York, N. Y.
SAKJ-17 (Rev.)-----	B-170	Seaway Mfg. Co., Inc., New Orleans, La.

### LUMINOUS CLOTH OR TAPE FOR MARKING INTERIOR ACCOMMODATIONS, ETC.

Continental Lithograph Corporation, 952 E. 72nd Street, Cleveland, Ohio, Conti-Glo, type P-11 luminous cloth or tape (1942).

E. P. Lynch, Inc., Providence, R. I., Lytape type P-12 luminous cloth or tape (1942).

Velvatone Poster Co., San Francisco, Calif., Velve-Glo, type D-7 blue green plastic tape (1943).

### OIL CLEANSING SOLUTIONS

Ninol Laboratories, 510 Dearborn Street, Chicago, Ill., Ninol-737 (2% solution) oil cleansing solution (1942).

Proctor & Gamble, Inc., Cincinnati, Ohio, Orvus (5% solution) oil cleansing solution (1942).

### CHEMICAL HEATING PADS

Bauer and Black, Chicago, Ill., Thermat chemical heating pad (1942).

Everhot Chemical Corporation, Newark, N. J., Everhot chemical heating pad (1942).

Master Hot Co., Pittsburgh, Pa., Master Hot chemical heating pad (1942).

Rose-Derry Co., Newton, Mass., Lightningpak chemical heating pad (1942).

**SIGNAL PISTOLS**

Acme Protection Co., Pittsburgh, Pa., Hammerless, grip marked "Acme."

Coston Supply Co., Inc., New York, N. Y.

(1) Hammerless, barrel marked "R. F. Sedgley, Inc., 37 M. M. Parachute Signal Pistol, Coston-Sedgley" with letter "S."

(2) Hammerless, barrel marked "Harrington & Richardson Arms Co., Worcester, Mass. U. S. A. Patent pending. For parachute and signal flares", breech block marked "Mark IV, 1 $\frac{1}{16}$ ."

(3) Hammer type, grip marked "Coston Supply Co., Inc., New York."

R. F. Sedgley, Inc., Philadelphia, Pa., Barrel marked "Sedgley Signal Pistol, Mark 4."

International Flare Signal Co., Tipp City, Ohio. Grip marked "International Flare Signal Co., Tipp City, Ohio."

Van Karner Chemical Arms Co., New York City., V-K, mark 12, parachute signal pistol (drawing No. S-100, dated October 16, 1942, rev. October 30, 1942).

**CARTRIDGE FLARES**

Acme Protection Co., Pittsburgh, Pa.

Coston Supply Co., Inc., New York, N. Y.

Cowdrey & Co., Inc., New York, N. Y.

International Flare Signal Co., Tipp City, Ohio.

Triumph Explosives, Inc., Elkton, Md.

**LIFEBOAT FENDERS (SKATES)**

Marine Safety Devices, Inc., New York, N. Y., (U. S. licensees of A. P. Schat, Utrecht, Holland) Schat skates (1938).

Welin Davit and Boat Corporation, Perth Amboy, N. J., skates and skid fenders for lifeboats (drawing No. 2409, dated October 30, 1942) (1942).

**DAYTIME DISTRESS SIGNALS (SMOKE SIGNALS)**

Coston Supply Co., Inc., New York, N. Y., Coston day floating smoke signal (1942).

Van Karner Chemical Arms Co., New York, N. Y., V-K Mark I smoke signals (1943).

**BILGE PUMPS FOR LIFEBOATS**

Blackmer Pump Co., Inc., Grand Rapids, Mich., No. PA202 pump (drawing dated October 30, 1942) (1942).

Gould Pumps, Inc., Seneca Falls, N. Y., fig. 965, size 3, pump (drawing No. 93-247, dated November 26, 1942, rev. December 23, 1942) (1943).

Amity Foundry & Machine Co., Perth Amboy, N. J., Amity No. 2 pump (drawings 1543, and 1544, dated December 9, 1942) (1943).

Federal Telephone and Radio Corporation, Newark, N. J., type T-W1 pump (assembly drawing F-42313-14A (2 sheets), cover plate drawing F-42316-12B) (1943).

F. E. Myers & Bro. Co., Ashland, Ohio, 1 $\frac{1}{4}$ -inch semirotary oscillating pump (assembly drawing No. 58-S-2, dated November 21, 1942) (1943).

The Deming Co., Salem, Ohio, Deming quadruple-acting oscillating hand force pump (drawing Nos. J-4138 $\frac{1}{2}$ , RR-4095 $\frac{1}{2}$ , RR-4113 $\frac{1}{2}$ ) (1943).

Bushcraft Marine Specialties, Los Angeles, Calif., Bucra All American wing pump No. 2 (drawing No. 7100, dated November 8, 1942, catalog No. B-400) (1943).



## DISTRIBUTORS

### ABANDON-SHIP KIT

City	Name of distributor	Address
Portland, Maine.....	J. E. Goold & Company.....	201 Federal St.
Boston, Mass.....	McKesson & Robbins, Inc.....	385 Summer St.
New York, N. Y.....	Wholesale Drug Specialists.....	30 West 15th St.
Philadelphia, Pa.....	Smith, Kline & French, Inc.....	105 North 5th St.
Baltimore, Md.....	Calvert Drug Company.....	106-8 West Redwood St.
Norfolk, Va.....	Henry B. Gilpin Company.....	129-135 West Main St.
Charleston, N. C.....	The Geer Drug Company.....	236 Meeting St.
Savannah, Ga.....	Solomons Company.....	109 Montgomery St.
Jacksonville, Fla.....	McKesson & Robbins, Inc.....	25 Market St.
Miami, Fla.....	McKesson & Robbins, Inc.....	212 N. E. 11th St.
Tampa, Fla.....	McKesson & Robbins, Inc.....	Tyler & Ashley Sts.
Mobile, Ala.....	McKesson & Robbins, Inc.....	S. E. Royal & St. Louis Sts.
New Orleans, La.....	I. L. Lyons & Company.....	800 Tchoupitoulas St.
Galveston, Tex.....	Star Drug Store, Inc.....	510-2 23rd St.
Houston, Tex.....	Southwestern Drug Corporation.....	1212-18 Preston Ave.
Los Angeles, Calif.....	Borun Brothers, Inc.....	1340 E. Seventh St.
Los Angeles, Calif.....	Los Angeles Drug Company.....	1136-38 San Julian St.
San Francisco, Calif.....	Coffin-Reddington.....	301 Folsom St.
San Francisco, Calif.....	McKesson & Robbins, Inc.....	42-60 First St.
Portland, Oreg.....	McKesson & Robbins, Inc.....	630 N. W. 14th Ave.
Seattle, Wash.....	McKesson & Robbins, Inc.....	419 Occidental Ave.

## U. S. COAST GUARD DISTRICT OFFICES

Pursuant to an executive order of the President, the functions and personnel of the Bureau of Marine Inspection and Navigation of the Department of Commerce were transferred to the United States Coast Guard on March 1, 1942.

The Supervising Inspectors have been replaced by Supervising Merchant Marine Inspectors who will be on the staff and eventually in the office of the district Coast Guard officer in each Coast Guard district.

The boards of local inspectors and shipping commissioners have also been replaced by Merchant Marine inspection offices headed by a Merchant Marine inspector in charge.

Personnel of the former Bureau of Marine Inspection and Navigation have been appointed to the new positions whose offices, as reorganized, are as follows:

### FIRST NAVAL DISTRICT

#### COAST GUARD BOSTON DISTRICT

Boston, Mass.....	District Coast Guard Officer.....	Customhouse.
Boston, Mass.....	Supervising Merchant Marine Inspector.....	Customhouse.
Boston, Mass.....	Merchant Marine Inspector in Charge.....	40 Broad Street.
Portland, Maine.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Providence, R. I.....	Merchant Marine Inspector in Charge.....	Post Office Annex.

### THIRD NAVAL DISTRICT

#### COAST GUARD NEW YORK DISTRICT

New York, N. Y.....	District Coast Guard Officer.....	Customhouse.
New York, N. Y.....	Supervising Merchant Marine Inspector.....	42 Broadway.
New York, N. Y.....	Merchant Marine Inspector in Charge.....	42 Broadway.
New London, Conn.....	Merchant Marine Inspector in Charge.....	Post Office Bldg.
New Haven, Conn.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Albany, N. Y.....	Merchant Marine Inspector in Charge.....	Federal Bldg.

### FOURTH NAVAL DISTRICT

#### COAST GUARD PHILADELPHIA DISTRICT

Philadelphia, Pa.....	District Coast Guard Officer.....	Customhouse.
Philadelphia, Pa.....	Supervising Merchant Marine Inspector.....	Customhouse.
Philadelphia, Pa.....	Merchant Marine Inspector in Charge.....	Customhouse.

### FIFTH NAVAL DISTRICT

#### COAST GUARD NORFOLK DISTRICT

Norfolk, Va.....	District Coast Guard Officer.....	New Post Office Bldg.
Norfolk, Va.....	Supervising Merchant Marine Inspector.....	New Post Office Bldg.
Norfolk, Va.....	Merchant Marine Inspector in Charge.....	Customhouse.
Baltimore, Md.....	Merchant Marine Inspector in Charge.....	Chamber of Commerce Bldg.

### SIXTH NAVAL DISTRICT

#### COAST GUARD CHARLESTON DISTRICT

Charleston, S. C.....	District Coast Guard Officer.....	Wentworth and Smith Streets.
Charleston, S. C.....	Supervising Merchant Marine Inspector.....	Customhouse.
Charleston, S. C.....	Merchant Marine Inspector in Charge.....	Customhouse.
Jacksonville, Fla.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Savannah, Ga.....	Merchant Marine Inspector in Charge.....	Customhouse.



## SEVENTH NAVAL DISTRICT

## COAST GUARD MIAMI DISTRICT

Miami, Fla.....	District Coast Guard Officer.....	Dupont Bldg.
Miami, Fla.....	Supervising Merchant Marine Inspector.....	News Tower Bldg.
Miami, Fla.....	Merchant Marine Inspector in Charge.....	News Tower Bldg.
Tampa, Fla.....	Merchant Marine Inspector in Charge.....	Federal Bldg.

## EIGHTH NAVAL DISTRICT

## COAST GUARD NEW ORLEANS DISTRICT

New Orleans, La.....	District Coast Guard Officer.....	Customhouse.
New Orleans, La.....	Supervising Merchant Marine Inspector.....	Customhouse.
New Orleans, La.....	Merchant Marine Inspector in Charge.....	Customhouse.
Galveston, Tex.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Mobile, Ala.....	Merchant Marine Inspector in Charge.....	U. S. Courthouse and Customhouse Bldg.
Port Arthur, Tex.....	Merchant Marine Inspector in Charge.....	Bluestein Bldg.

## NINTH NAVAL DISTRICT

## COAST GUARD CLEVELAND DISTRICT

Cleveland, Ohio.....	District Coast Guard Officer.....	Keith Bldg.
Cleveland, Ohio.....	Supervising Merchant Marine Inspector.....	Keith Bldg.
Cleveland, Ohio.....	Merchant Marine Inspector in Charge.....	Keith Bldg.
Buffalo, N. Y.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Detroit, Mich.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Duluth, Minn.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Oswego, N. Y.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
St. Ignace, Mich.....	Merchant Marine Inspector in Charge.....	Municipal Bldg.
Toledo, Ohio.....	Merchant Marine Inspector in Charge.....	U. S. Courthouse and Customs Bldg.

## COAST GUARD CHICAGO DISTRICT

Chicago, Ill.....	District Coast Guard Officer.....	Customhouse.
Chicago, Ill.....	Supervising Merchant Marine Inspector.....	Customhouse.
Chicago, Ill.....	Merchant Marine Inspector in Charge.....	Customhouse.
Ludington, Mich.....	Merchant Marine Inspector in Charge.....	National Bank of Ludington.
Milwaukee, Wis.....	Merchant Marine Inspector in Charge.....	Federal Bldg.

## COAST GUARD ST. LOUIS DISTRICT

St. Louis, Mo.....	District Coast Guard Officer.....	Old Customhouse.
St. Louis, Mo.....	Supervising Merchant Marine Inspector.....	Old Customhouse.
St. Louis, Mo.....	Merchant Marine Inspector in Charge.....	New Federal Bldg.
Cairo, Ill.....	Merchant Marine Inspector in Charge.....	New Post Office Bldg.
Cincinnati, Ohio.....	Merchant Marine Inspector in Charge.....	New Post Office Bldg.
Dubuque, Iowa.....	Merchant Marine Inspector in Charge.....	Post Office and Courthouse Bldg.
Louisville, Ky.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Memphis, Tenn.....	Merchant Marine Inspector in Charge.....	Customhouse.
Nashville, Tenn.....	Merchant Marine Inspector in Charge.....	Stahlman Bldg.
Pittsburgh, Pa.....	Merchant Marine Inspector in Charge.....	Park Bldg.
Point Pleasant, W. Va.....	Merchant Marine Inspector in Charge.....	Post Office Bldg.

## TENTH NAVAL DISTRICT

## COAST GUARD SAN JUAN DISTRICT

San Juan, P. R.....	District Coast Guard Officer.....	Federal Bldg.
San Juan, P. R.....	Supervising Merchant Marine Inspector.....	Federal Bldg.
San Juan, P. R.....	Merchant Marine Inspector in Charge.....	Federal Bldg.

## U. S. COAST GUARD

## ELEVENTH NAVAL DISTRICT

## COAST GUARD LONG BEACH DISTRICT

Long Beach, Calif.....	District Coast Guard Officer.....	Federal Bldg.
Long Beach, Calif.....	Supervising Merchant Marine Inspector.....	Times Bldg.
Long Beach, Calif.....	Merchant Marine Inspector in Charge.....	Times Bldg.

## TWELFTH NAVAL DISTRICT

## COAST GUARD SAN FRANCISCO DISTRICT

San Francisco, Calif.....	District Coast Guard Officer.....	Customhouse.
San Francisco, Calif.....	Supervising Merchant Marine Inspector.....	Customhouse.
San Francisco, Calif.....	Merchant Marine Inspector in Charge.....	Customhouse.

## THIRTEENTH NAVAL DISTRICT

## COAST GUARD SEATTLE DISTRICT

Seattle, Wash.....	District Coast Guard Officer.....	Federal Bldg.
Seattle, Wash.....	Supervising Merchant Marine Inspector.....	Federal Bldg.
Seattle, Wash.....	Merchant Marine Inspector in Charge.....	Federal Bldg.
Portland, Oreg.....	Merchant Marine Inspector in Charge.....	Failing Bldg.

## COAST GUARD KETCHIKAN DISTRICT

Ketchikan, Alaska.....	District Coast Guard Officer.....	Federal Bldg.
Juneau, Alaska.....	Supervising Merchant Marine Inspector.....	Federal Bldg.
Juneau, Alaska.....	Merchant Marine Inspector in Charge.....	Federal Bldg.

## FOURTEENTH NAVAL DISTRICT

## COAST GUARD HONOLULU DISTRICT

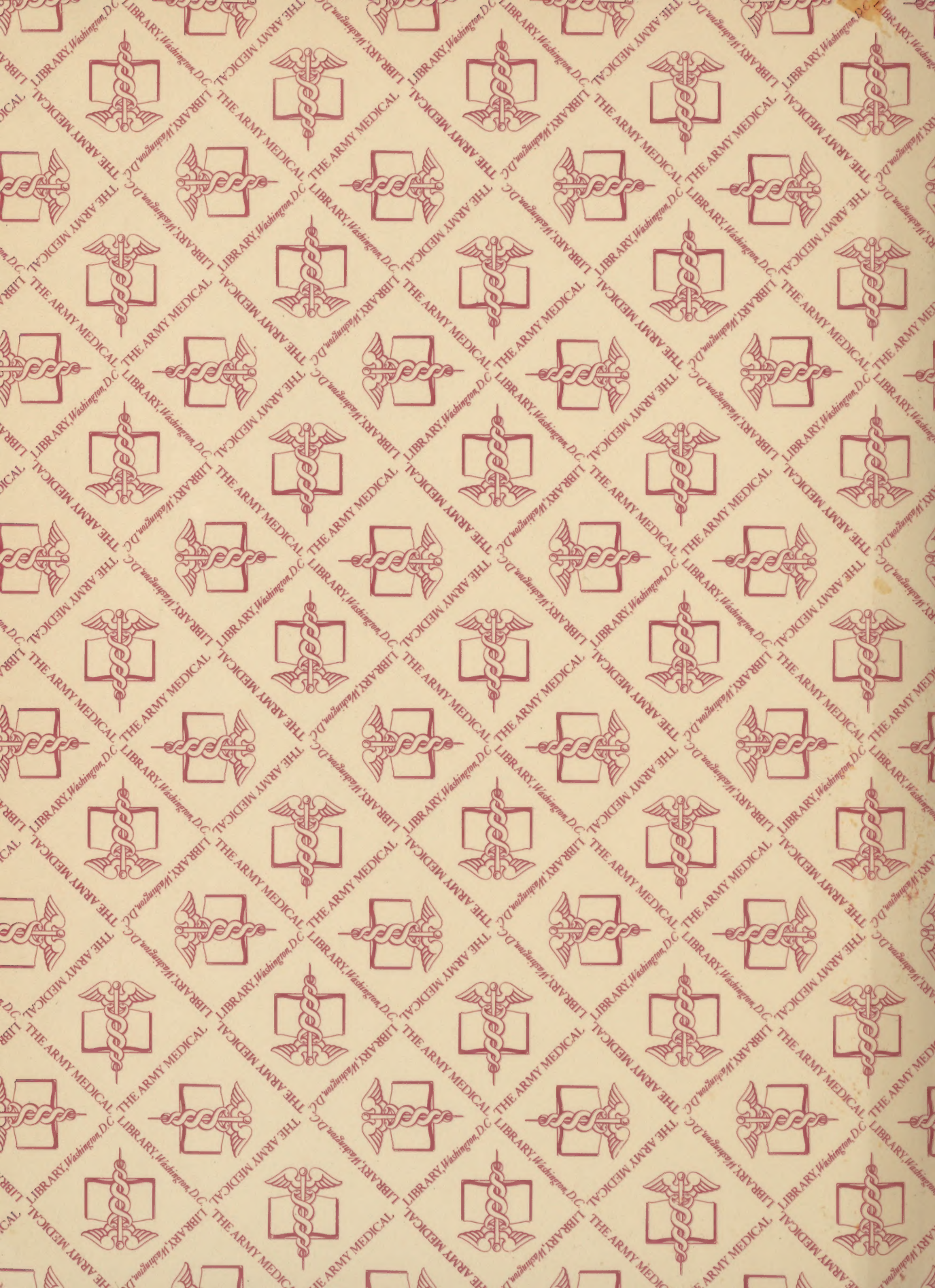
Honolulu, T. H.....	District Coast Guard Officer.....	Federal Bldg.
Honolulu, T. H.....	Supervising Merchant Marine Inspector.....	Dillingham Bldg.
Honolulu, T. H.....	Merchant Marine Inspector in Charge.....	Dillingham Bldg.



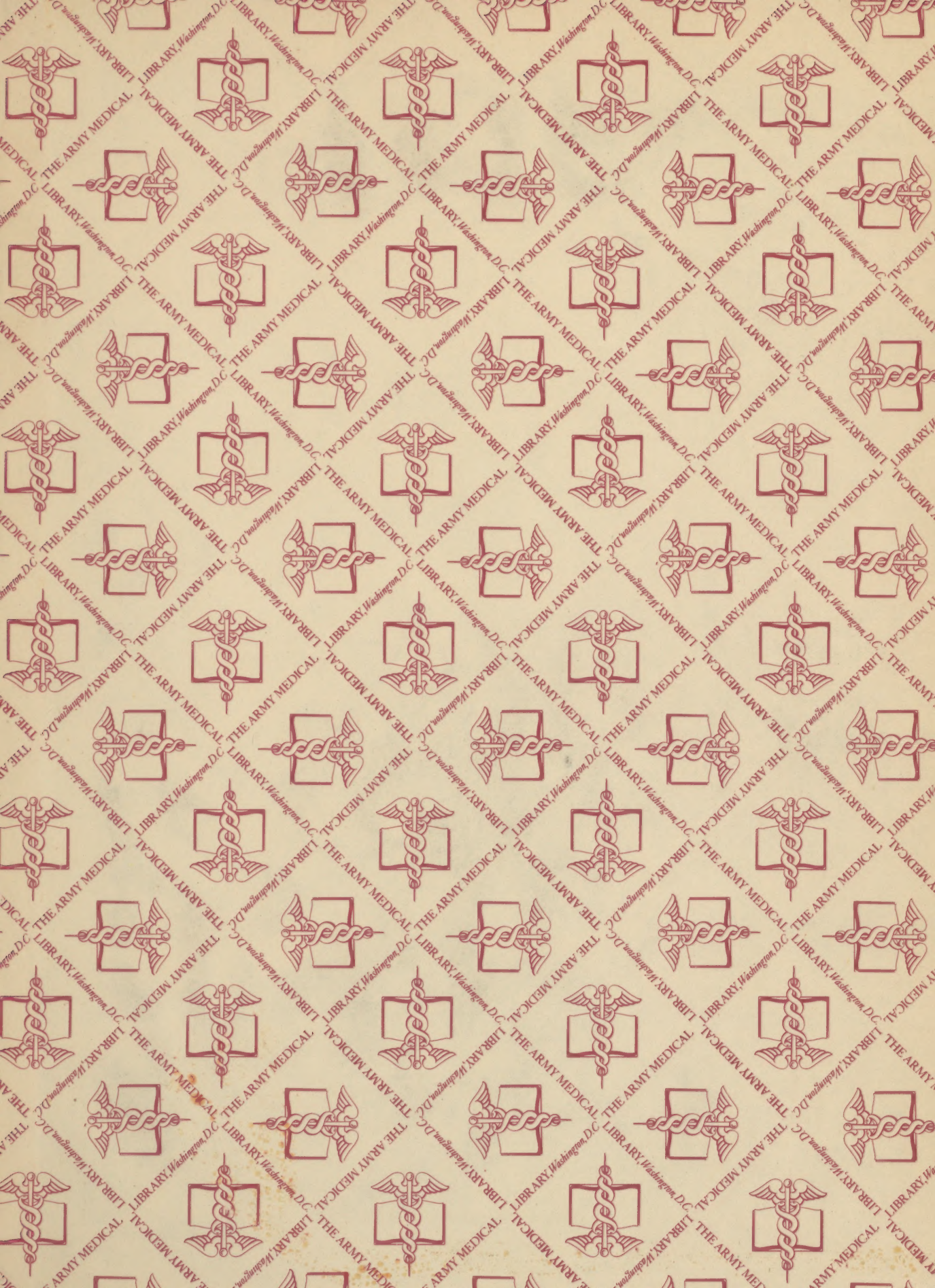














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